University of Alberta

Analyzing Violent Events Using Qualitative Comparative Analysis

by

Michael John Gulayets ©

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Arts

Department of Sociology

Edmonton, Alberta

Spring, 1999

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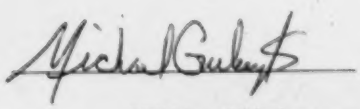

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled Analyzing Violent Events Using Qualitative Comparative Analysis submitted by Michael John Gulayets in partial fulfillment of the requirements for the degree of Master of Arts.

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June 14, 1999.

Dedication

This thesis is dedicated to my parents, John and Mary Anne Gulayets, whose support and encouragement, throughout all of my life's endeavors, has been unwavering.

This thesis is also dedicated to Denise Larsen, my partner in life and academics.

Abstract

The goal of this research project was to identify the factors that contribute to the better understanding of violent interactions that result in physical harm to the victim. Using the criminal event perspective, this research examined several psychological, situational and activating factors thought salient in violent incidents. The research participants were 464 men referred to a forensic mental health clinic because of violent behaviour. The participants' accounts of the violent incident that resulted in their arrest were analysed using Qualitative Comparative Analysis (Ragin, 1987). The strength of this method lies in its ability to analyze multiple, complex interactions in the data structure. This method works, using Boolean reduction techniques, to identify the most logical, parsimonious configuration of factors that, taken together, constitute both necessary and sufficient conditions for an outcome to occur. The analysis, conducted in three stages, indicated that no *single* condition studied is either necessary or sufficient in violent outcomes. The analysis also suggested that the study of violent interactions would benefit from including factors from multiple levels of explanation, and that several different models of violent interactions are required to explain interpersonal violence.

Acknowledgements

I would like to thank my thesis committee, Dr. Jim Creechan, Dr. Judith Golec, Dr. Jack Goldberg, and Dr. Les Kennedy, for their generous support, feedback and encouragement throughout this research process.

I would also like to thank the men who shared their experiences with me by filling out the questionnaire, as well as the staff at FACS, especially Bob Reddick and Pat Messal, for their support and assistance.

Finally, a very special thank you to my partner Denise Larsen, who not only read, re-read, and critiqued all versions of this thesis, but who has also nourished an intellectual atmosphere that not only challenges me, but also encourages me to work at my full potential. All my love and appreciation to you, Denise.

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Chapter I

Introduction

Interpersonal conflict is an ubiquitous feature of human nature. It is considered a pervasive and inevitable characteristic of social life (Kennedy, 1990). In our society, violent offenders receive a great deal of attention. They are feared by individuals, an issue of concern within communities, a constant feature in the media, highly represented in the courts and prisons, and the subject of analysis for social scientists. Researchers have studied many different areas of human experience and conditions in attempting to understand interpersonal conflict. However, despite the vast amount of attention that this phenomenon receives, the etiologies of violence remain elusive and a matter of intense debate.

In the study of violent behaviour, many theoretical and epistemological choices arise. For the most part, these choices are resolved by the disciplinary preferences or traditions of the particular researcher (Gottfredson & Hirschi, 1990; Reiss & Roth, 1993; Tedeschi & Felson, 1994). As such, when studying violent behaviour, researchers accentuate a particular level of explanation. For example, biologists focus on heredity, genetic codes, biochemical factors, or central nervous system activity. Psychologists look to personality, learned associations, emotions, internal tensions and frustrations, and family dynamics. Sociologists refer to demographics, socioeconomic status, culture, and organization. While other disciplines (e.g., anthropology, economics) may also study violence and aggression, the biological, psychological, and sociological disciplines have provided the greatest amount of literature in the area. Unfortunately, studies within these fields rarely consider more than one level of explanation (Reiss & Roth, 1993; Short,

1985,1998). Therefore, the disciplines studying violent behaviour have produced largely disparate bodies of knowledge.

Several theoretical and methodological issues will be addressed in this thesis. For example, this work will examine issues around the level of explanation and analysis (i.e., psychological vs. sociological), the selection of research participants (i.e., offenders vs. general population), and the method of analysis (i.e., quantitative vs. qualitative). The aim is not to determine which perspective is best or correct, but to acknowledge that each perspective has the potential to add important information to the study of violent behaviour.

After reviewing these issues, this thesis will provide an analysis of violent interactions. While recognizing that many levels are salient in violent behaviour, the analysis will highlight the psychological, situational and transactional elements of the violent event. The thesis will analyze, using Qualitative Comparative Analysis, accounts of violent incidents provided by violent male offenders referred to a mental health clinic for an anger management program.

Research Synopsis

Previous attempts to understand interpersonal violence have sought to discover the factors thought to cause violent behaviour. The most common explanations of the phenomena can be categorized as either 1) psychological explanations, which focus on intrapersonal traits of the individual, or 2) sociological explanations, which focus on demographics, social structures, or cultural dynamics. These psychological or sociological explanations of violent behaviour search, respectively, for particular personal characteristics associated with aggressive behaviour, or for social characteristics

associated with high violence rates. However, despite the impressive list of characteristics that has been explored, no single factor has been found that clearly "causes" violent actions. Consequently, more recent research has focused on the combinations of characteristics of the violent offender, the contextual aspects of the violent incident, and the interconnections between the two.

To help organize discussion about the various factors salient in violent behaviour, please refer to Table 1 (adapted from Reiss & Roth, 1993, p. 297). This table presents a matrix for classifying risk factors with the units of observation and explanation running on the rows and the proximity to the violent event running on the columns. The units of observation are divided into social and individual levels. The social level is further divided into two levels: the macrosocial level, which is concerned with *institutions* such as societies and communities, and the microsocial level, which is concerned with *encounters* between pairs of individuals or small groups. The individual level is also further divided into a psychological level and a biological level. The columns in the matrix classify risk factors by their proximity to the violent event. The first column from the left contains the predisposing factors or processes. These conditions can be seen as distal or more long-standing *traits* within an individual or social structure that create the potential for violence to occur. The middle column contains the situational factors. These factors can be seen as *states* that are present in a specific circumstance that results in a violent outcome. The final column contains the activating factors. These factors can be seen as the *triggers* to the violent incident.

Table 1

Matrix For Organizing Risk Factors For Violent Behaviour

Units of Observation & Explanation	Proximity to Violent Events		
	Predisposing (Traits)	**Situational (States)**	**Activating (Triggers)**
SOCIAL **-Macrosocial**	- Concentration of poverty - Sex-role socialization	- Physical structure - Routine activities	- Catalytic social event
-Microsocial	- Family disorganization - Gangs	- Participants' social relationship - Weapons use	- Participants' communication exchange
INDIVIDUAL **-Psychological**	- Temperament - Learned social responses - Cognitive ability	- Emotions - Alcohol/drug consumption	- Impulse
-Biological	- Neurobiologic traits - Genetic traits	- Transient neurobiologic states	- Sensory signal-processing errors

Adapted from Reiss, A.J., & Roth, J.A. (1993). Understanding and preventing violence: Vol. 1. Washington: National Academy Press.

The factors listed in each cell of the matrix of Table 1 are not meant as a definitive list, but rather as illustrative examples at that particular level of observation and proximity to the violent event. No single level is considered more essential than any other level. Rather, violent incidents are thought to be the result of interactions across the rows and columns of the matrix. For example, "a violent event requires the conjunction of a person with some (high or low) predisposing potential for violent behaviour, a situation with elements that create some risk of violent events, and usually a triggering event" (Reiss & Roth, 1993, p.298). In addition, cells in the matrix may make differential contributions to different kinds of violence. A particular cell might be very important in one particular violent incident, but not contribute at all in another incident.

Consider carefully the matrix in Table 1. To date, most research on violence has focused on predisposing traits (i.e., first column) at the macrosocial, psychological and biological levels of observation. However, recent theorizing and research suggests that situational and activating factors (i.e., second and third columns), as well as microsocial level phenomena (i.e., second row) must also be considered in the study of violent incidents (Birkbeck & LaFree, 1993; Felson & Steadman, 1983; Luckenbill, 1977; Savitz et al., 1991; Sommers & Baskin, 1993).

Short (1985, 1998) defines the microsocial level as seeking answers about the *structure* and *interaction* of social encounters between individuals or small groups that produce behaviours of interest. The *structure* of social encounters refers to situational states present at a violent event. These situational states may include 1) properties of the physical setting in which the incident takes place (e.g., presence of weapons or bystanders), or 2) characteristics of the social relationship between participants (e.g.,

previous violent encounters). The other component of the microsocial level is what Short calls *interactional* factors (or what Reiss and Roth (1993) call activating factors). These factors include elements of the communication exchange that occurs between participants that may trigger a violent incident, such as a provoking comment. Most research would label all the factors discussed in this paragraph as "independent variables".

The object of investigation (what is typically labeled the "dependent variable") at the microsocial level is also distinct from the other levels of observation. For example, at the microsocial level, the phenomena to be explained is an *event outcome* that occurs between participants (e.g., victim suffers physical harm). Whereas at the individual/psychological level the phenomena to be explained are *behavioural responses* of a particular individual (e.g., aggressive behaviour). The microsocial level is also distinguished from the macrosocial level which identifies the phenomena to be explained as *crime rates*, and relates these rates to aggregate level social structural variables or processes. As can be seen, microsocial analysis provides an important link between the psychological-orientated individual level of explanation and the sociological-orientated macrosocial level. However, Short (1985, 1998) considers the microsocial level a neglected area of research, noting that research questions at this level are least often asked.

This thesis will analyze factors, at both the psychological and microsocial levels of observation, that span all three proximities (i.e., predisposing, situational and activating) to the violent event. This thesis takes the view that interpersonal conflict is best understood as a "violent event" (Kennedy and Forde, 1999; Sacco and Kennedy, 1996). This perspective sees aggressive behaviour as characterized as a process, with

definable stages both prior to the violence and in the aftermath of the incident. Thus, the event outcome is examined in relation to predisposing psychological factors of participants, the situational characteristics of the incident, as well as interactional elements that might have triggered the incident. The objective of this thesis is to determine which conditions or combinations of conditions are likely important in violent outcomes. The thesis will analyse the accounts of violent events provided by violent offenders referred to a forensic outpatient clinic. It is expected that this analysis will provide insight into the combinations of individual, situational, and social processes that result in violent outcomes. These insights will be important as the results will be useful in helping to understand and ameliorate interpersonal violence. Specifically, the information that this thesis will provide about the specific combinations of conditions that result in violent outcomes will facilitate the planning and process of an anger management program.

As discussed above, much of the previous research on violence has focused on single factors - either psychological or sociological - of violent offenders. This research focuses generally on patterns of covariation among the variables of interest. Typically, in multivariate statistical models, causation is additive, and the goal is to estimate the separate contribution of each cause. Different causes increase or decrease the probability of a certain outcome independently of one another. The assumption is that an effect of a cause is the same across different contexts.

However, this thesis takes the approach that factors that are important in violent incidents may not have the same effect across all contexts. Any one factor might have opposite effects in different contexts. In other words, factors interact with one another in

complex ways. Therefore, analysis must embrace the complex interactions that result in violent outcomes. An analysis strategy that is able to deal with complex interactions is necessary. To this end, the thesis will utilize Qualitative Comparative Analysis (Ragin, 1987).

Qualitative Comparative Analysis (QCA) is a strategy that utilizes Boolean logic and algebra. The technique of Boolean analysis is relevant to any investigation that is oriented toward viewing cases or instances as combinations of conditions. This method works, not to specify a single model that best fits the data, but to determine the number and character of the different models that exist among comparable cases. In this way, QCA is able to highlight the complexity, diversity, and uniqueness of violent events. There are two important implications that follow from QCA's use of Boolean techniques (Griffin & Ragin, 1994). First, the importance of any one condition is understood to be contingent on the presence or absence of other conditions. In other words, causation is not additive, but is what Ragin (1987) calls configurational or conjunctural causation. The second important implication is that more than one combination of conditions is usually necessary to account for all cases with the outcome of interest, a condition known as causal heterogeneity. In dealing with causality, QCA does not consider causation in probabilistic terms. Conditions do not increase or decrease the likelihood of an event or outcome, rather, QCA seeks to uncover all the attributes or circumstances that actually lead to a particular event or outcome (Cloverdill, et al., 1994).

In sum, this technique provides a unique perspective in the analysis of violent events. This type of analysis combines elements of both quantitative and qualitative analyses. QCA's strength lies in its ability to analyse complex interactions (a strength of

qualitative methods) across a large number of cases (a strength of quantitative methods). Thus, a Boolean analysis is able to complement both quantitative and qualitative techniques.

Research Objectives

This research project has two objectives. The first is to conduct an analysis that reaches beyond a singular focus with respect to the predisposing psychological traits of the violent offender or the predisposing factors of the social structure, to include the situational and activating factors that shape violent events. The second goal is to demonstrate that in order to better understand violent outcomes, analyses must consider that conditions do not act in isolation, but rather interact with each other in complex ways. To this end, several conditions salient in violent events will be analysed, using QCA, with the following research questions in mind:

1. Which combinations of predisposing factors, situational factors and activating factors bring about violent outcomes?
2. Which of these factors are most important in violent outcomes?
3. Do different combinations of factors produce similar outcomes?

Chapter Outlines

The second chapter will contain a review of previous literature pertaining to explanations of violent behaviour. The review is divided into two parts. The first part reviews the prominent biological, psychological, and sociological factors associated with violent behaviour. The second part reviews the research that considers violent events as a "situated transaction" by including situational and activating factors in the analysis.

The third chapter will review the research setting, the research instrument, participants, data collection procedures, and ethical considerations. This chapter will also present a thorough description of the analysis strategy. Following a brief review of traditional quantitative and qualitative techniques, a detailed description of Qualitative Comparative Analysis and the steps involved in conducting this type of analysis is presented. The chapter concludes with a discussion and a listing of the six conditions and the outcome of interest that will be analyzed using QCA.

The fourth chapter will provide the results of the Qualitative Comparative Analysis of violent events. The chapter is divided into three separate sections. Each section includes a description and the results of a separate QCA analysis.

The final chapter will utilize the findings of the study to discuss the implications of analysing contextual factors when studying violent events. The chapter will also tie in the results with previously discussed theoretical perspectives and provide some recommendations for further research.

Chapter II

Review of the Literature

Attempts to understand and explain violent behaviour come from many different theoretical positions. Most research in the area focuses on a particular aspect of the violent incident (i.e., location) or, more commonly, on particular traits of the violent offender (i.e., socio-economic status). Hirschi and Gottfredson (1986) provide a useful distinction between these two perspectives. They make the distinction between crime and criminality where crime refers to "short term, circumscribed events that presuppose a peculiar set of necessary conditions (e.g., activity, opportunity, adversaries, victims, goods)" (p. 58). On the other hand, criminality refers to "stable differences across individuals in the propensity to commit criminal (or equivalent) acts" (p58). Using these definitions, Hirschi and Gottfredson assert that criminality is only one element in the causal configuration of any particular criminal act. In addition, criminal acts are seen as imperfect measures of criminality. This section will review the research perspectives that have been most influential in the explanation of violent behaviour. First reviewed will be the perspectives that search for the factors indicating criminality. These factors are located in the left column of the risk factor matrix presented in Table 1, in Chapter I. The second part of this chapter will review the research that looks at the contextual factors involved in violent criminal events. These factors are located in middle and right columns of Table 1.

Criminogenic Factors of Violent Behaviour

Most previous research into violent behaviour has concentrated on issues of criminality (Bridges & Weis, 1989; Sampson & Lauritsen, 1993). This research seeks to

identify the predisposing factors, either within the individual or within the macrosocial structures in which the individual resides, which are thought to produce violent behaviour. In this literature, three main perspectives can be identified: biological, psychological and sociological. The majority of the studies using these perspectives have been descriptive and focused either on individual-level correlates of violent offending or on community-level correlates of violence rates. Research has consistently explored factors such as personality problems or psychopathology, violence in the family of origin, low socioeconomic status, social stress and isolation (to name just a few) as paramount issues in violent behaviour. However, even studies testing the same single-factor often produce widely differing results, which suggests the multi-dimensionality and complexity of the topic. The following sections will review the *modus operandi* behind the biological, psychological, and sociological perspectives in the study of violent behaviour.

Biological factors. Early biological studies proposed that criminal acts are the result of inborn anatomical, physiological, or genetic abnormalities (e.g., Lombroso, 1876). All criminal behaviour was thought to be caused by these abnormalities. However, these biological studies have been criticized on many accounts including faulty methodology, tautological reasoning, and the fact the empirical evidence did not really support the theories (Akers, 1997).

More recent refinements to the biological approach have concentrated on factors such as instincts, genes, pain-elicited reflexive fighting, hormones, brain structures or an inborn aggressive drive that might be related to aggressive behaviour (Tedeschi & Felson, 1994). For example, modern biological research is now exploring how information in the environment is processed by the nervous system. Attention is focused

on how excitatory and inhibitory neural signals in sensory and motor pathways interact with arousing, affective, and memory processes that involve chemical neurotransmitters and hormones (Reiss & Roth, 1993).

While biological factors can be demonstrated to be salient in aggression in subhuman species, in solo they do not provide an adequate explanation for complex human behaviours. These factors may, however, affect mood states, emotions, and other internal conditions that may indirectly affect the likelihood of aggression under certain conditions (Tedeschi & Felson, 1994). Modern biological theorizing moves beyond the simplistic determinism of the early theories to the interaction of these factors with the physical and social environment (Akers, 1997).

Psychological factors. Like the biological perspective, the psychological perspective often focuses on a single factor within the individual to explain human behaviour. Psychological studies attend to concepts like predisposition, traits, or personality in their search for causes of violent behaviour. These single-factor psychological theories rely on the assumption that the "more intense the psychological impairment, the greater the chance that criminal actions will result" (Lincoln & Straus, 1985, p. 50). The presumption is that violent behaviour is only a symptom of an underlying psychological problem within the individual.

The most common psychological hypothesis of violent behaviour is the personality/psychopathology theory. This theory posits that violence is an expression of such deviant personality traits as impulsiveness, aggressiveness, sensation-seeking, rebelliousness, hostility, etc. (Akers, 1997). Several studies have investigated the occurrence of personality disorders in violent men (for reviews see: Holtzworth-Munroe

& Stuart, 1994; Hotaling & Sugarman, 1986; Tolman & Bennett, 1990). However, there is little agreement regarding a definitive personality profile. Commonly, studies report that violent men have similar clinical features to males with borderline and antisocial personality disorders (Else et al., 1993), or severe identity problems and intense dependency on women (Dutton, 1994). However, this research also suggests that violent men need not have personality disorders. This conclusion comes from the fact that research subject pools have been highly biased. The men that have been analysed in these studies are generally in treatment programs for battering and are more psychopathological than men who have not been identified or charged with wife battering. In other words, violent behaviour is not limited to men with personality disorders, but these men do comprise the majority of the population in treatment programs. In the case of men who are violent and have psychopathologies, a causal relationship between these two variables is dubious. The issue of tautology must be considered in these cases since the diagnostic measure used to classify persons as psychopathic are simply indicators of a prior history of deviant or criminal behaviour, such as frequent arrests, abuse of others, and fighting (Akers, 1997).

A recent theory in the literature has drawn much attention. In their general theory of crime, Gottfredson and Hirschi (1990) suggest that general patterns in individual behaviour particularly associated with low self-control are consistent with criminality including violence. Gottfredson and Hirschi characterize individuals who lack self-control as: impulsive, insensitive, physical (as opposed to mental), risk-taking, short-sighted, and nonverbal (p. 90). These patterns of low self-control are learned as children and remain relatively stable throughout the lifecourse. Gottfredson and Hirschi claim

that these patterns of behaviour are reinforced as they provide the immediate gratification of desires that people with low self-control seek. Thus, according to the general theory of crime, all individuals are prone to criminality, but it is those with weak self-constraint, and an appropriate opportunity, that are most likely to commit crimes.

Other psychological conditions such as difficulties with depression, low self-esteem or alcohol/drug abuse have also been put forward to explain violent behaviour. The main criticism of these theories, as with the personality theories, has been that many violent men do not exhibit these characteristics or that these characteristics do not define the majority of violent men. In sum, research conducted using psychological factors or personality traits as indicators of violent behaviour has not been able to produce definitive findings that support these factors as causes of violent behaviour. Instead, Tolman and Bennett (1990) suggest that exploration of psychopathology in violent men can be informative only if it is linked to other levels of analysis that explicate rather than obscures the connections between the individual behaviour and social variables.

Sociological factors. Like the biological and psychological perspectives, sociological studies often search for single factors that are related to violent behaviour. However, at the macrosocial or sociological level of explanation, studies look at aggregate data in the search for demographic, social, cultural, or organizational factors that are associated with violent crime rates. This section will review the socio-demographic characteristics of violent offenders and the social structural characteristics or processes that have been hypothesized to cause violent behaviour.

The search for socio-demographic correlates of offending have dominated the violence literature (Bridges & Weis, 1989). This literature looks to the socio-

demographic characteristics of offenders in an attempt to understand violent behaviour. In general, research consistently finds correlations between violent offending and such ascribed offender characteristics as age (violent offenders are more likely to be young; median age is about 30 years) and gender (males are much more likely to commit violent crimes) (Janhevich, 1998). Other relationships between socio-demographic characteristics and offending tend to be more contested. For example, low socio-economic status is often thought to be a significant risk factor in violent offending. However, empirical data find only a weak relationship between social class and violent offending (Bridges & Weis, 1989; Hindelang et al., 1979). Other factors, such as marital status, physical abuse as a child, family of origin functioning (i.e., quality of family life) and prior criminal record, have all been associated with violent behaviour, however, the correlations tend to be small and the reasons for the associations are not yet clearly understood (Sampson & Lauritsen, 1993).

Likewise, many social-structural characteristics have been correlated with violence rates. The goal of this type of research is not to explain individual involvement in violent behaviour, but to isolate characteristics of communities, cities, or societies that lead to high rates of violence. Factors such as concentrations of poverty, residential mobility and population turnover, family disruption, high density housing and population, and disturbances in social organization have been associated with high violent crime rates (Sampson & Lauritsen, 1993). However, once again, no social-structural factor fully explicates violent crime rates, and most factors show only weak direct effects on violent offending.

Another avenue of research in the sociological perspective is the study of social processes. Certain social processes are hypothesized to produce conditions that encourage violent behaviour. These processes occur, external to the individual, at a community or macro level, but influence individual behaviour. For example, the blocked opportunities theory states that violence and other forms of crime are the result of a disjunction between goals and means (Merton, 1957). When there is a poor fit between culturally defined goals and culturally acceptable means to achieve them, crime is more likely to result. For example, the possession of money and status are valued in our society, however, lower class individuals often lack the means (e.g., educational opportunities) to attain this goal. Therefore, they turn to violence and other illegal acts to obtain money and gain status in their subculture.

Another social process often thought to cause violent behaviour is called the subculture of violence theory (Wolfgang & Ferracuti, 1967). This theory focuses on the socialization of members of subcultural groups. It is thought that violence is valued in some groups of the population and that the attitudes and beliefs of the group support the use of violence in certain circumstances. In these subcultures, violence may be considered synonymous with courage, honor and toughness, and thus violent behaviour is not only condoned, but also rewarded. In other words, an imbroglio would be an acceptable and expected outcome to a provocation. However, subcultural theories rarely address the origin of the values, beliefs and attitudes that lead to violent behaviour. The theory is better at delineating differences between cultural groups than explaining what causes violence (Tedeschi & Felson, 1994).

While the sociological perspective includes both demographic and community-level analysis, the same criticisms can be made of the sociological correlates of violent behaviour as of the biological or psychological correlates. Statistical relationships between socio-demographic or social structural variables and violence do not explain how violence occurs, only that an association exists between the factor and violent behaviour. Not all violent offenders have the same demographic profile, and poor social-structural conditions do not automatically bring about high violence rates. It is difficult to isolate specifically if and how these factors influence violent events. Likely, an interaction between many factors is necessary to bring about a violent event.

Summary of criminogenic factors. In criticism, biological, psychological, or sociological research that focuses on a single factor to provide an explanation of violence do no more than link violent behaviour to existing genetic, behavioural, historical, or demographic characteristics. These theories concentrate on particular traits of the offender, assuming that violence will result if these particular conditions are present. Also, much of this research is problematic because of the causal confounding and alternative causal interpretations that can arise in designs relying on a single level of analysis. Prior analyses of predisposing factors of violent offenders generally have not considered the possible effects that situational or activating factors might have on an individual's experience with violence (Sampson & Lauritsen, 1993; Short, 1985, 1998). It is possible that the criminogenic factors are mediating the effects of these contextual conditions. However, much of the current violence research overlooks the contextual factors that also may contribute to violent outcomes.

What is necessary is an approach to the problem that begins to take into account the heterogeneity of the current research and the complexity of human social conduct. As suggested by Tolman and Bennett (1990), single-factor theories can be most useful if they are linked to broader levels of analysis. In single-factor studies, the unit of analysis is the individual and his or her characteristics, behaviours or attitudes. What is rarely considered is the immediate context of the violent event. Therefore, if criminality factors alone are insufficient to fully understand violent behaviour, we must also consider contextual aspects of the violent event. This thesis project attempts to broaden the scope of analysis to include situational and activating factors that occur in violent incidents. In this case, the violent event becomes the unit of analysis. Analysing factors both of criminality and of context may lead to an expanded understanding of violent behaviour.

Contextual Factors of Violent Events

If issues of criminality are insufficient to fully understand violent behaviour, we must expand our study to the situational elements of the violent event and the activating factors that occur between participants in a violent incident (Birkbeck & LaFree, 1993; Felson & Steadman, 1983; Savitz et al., 1991; Sommers & Baskin, 1993; Sutherland, 1947). The contextual elements of violent events are represented in the middle and right columns of the risk factor matrix presented in Table 1 in Chapter I.

As early as 1947, Sutherland distinguished between "historical" or "situational" explanations of crime. He defined historical explanations as processes operating in the offender's previous history and situational explanations as processes operating at the moment of the crime's occurrence. Sutherland even believed that situational explanations could provide "superior" explanations for crime. However, despite the acknowledged

importance of contextual aspects, only recently has research shifted from focusing nearly exclusively on factors affecting the offender to considering factors affecting the violent event (Birkbeck & LaFree, 1993). This shift corresponds to the shift in focus from criminality to crime. Rather than concentrating on the predisposing factors that an individual brings to a violent event, the analysis has expanded to include the factors salient in the interaction. In their distinction between crime and criminality, Hirschi and Gottfredson (1986) point out that criminality is a necessary but not sufficient condition for crime to occur, because crime also requires contextual elements. Therefore, any particular criminogenic trait may be salient in a violent event, but we must also consider the situational and activating elements that are present. In making this shift, issues of criminality are not overlooked. Instead, they are now considered as one element in a violent event, rather than the determining cause of violent behaviour.

As for studies of violent events, previous research has been conducted on the social interaction that occurs in homicides. This research provides us with the opportunity to understand the role that context plays in violent behaviour. Early research focused on the role of the victim in the violent event (Curtis, 1974; Wolfgang, 1957). This research showed that victim behaviour often precipitated violent responses from the offender. Building on this research, Luckenbill (1977) suggested that the disputants in a homicide engage in a series of "situated transactions" that are essentially character contests. These transactions result in a murder when an individual attacks another individual in an attempt to "save face". In an attempt to quantify this hypothesis, Savitz, et al. (1991) found that over half of all murders they studied contain an informal contest of character that resulted in murder even though one or both of the individuals could have resolved

the conflict before the homicide took place. Thus, it seems that the interaction between participants, not necessarily the behaviour of any one participant, is important in violent events.

Other research has introduced the importance of including multiple elements from the risk factor matrix. For example, using Hocker and Wilmot's (1985) concept of conflict styles, Kennedy and Forde (1999) describe a process called "routine conflict". This process is a habitual behaviour pattern which individuals develop to resolve interpersonal conflict. These methods of conflict resolution constitute a repertoire of learned behaviours that are applied to particular situations. That is, individuals develop a response set that is utilized in specific situations. This conflict style is not a psychological state, but is a pattern of behaviour applied in a manner consistent with the person's personality, past learning, and which they consider appropriate to the social context that they confront (Hocker & Wilmot, 1985). In other words, these styles are not determined solely by individual behaviour or personality, but also by the nature of the social interaction that occurs between individuals. Here, the patterns of interaction and the individual's unique response set are important. As can be seen, this approach takes into consideration both the criminogenic factors of the offender and the contextual factors of the crime.

A third theoretical examination that takes into account multiple elements of the risk factor matrix can be found in Gottfredson and Hirschi's (1990) general theory of crime. Gottfredson and Hirschi propose that a crime will occur if a person with low self-control is given the appropriate opportunity. Opportunity is defined by the logical structure of the crime and will therefore vary from one specific offense to another

(Barlow, 1991). To integrate these two aspects then, a crime will likely occur if a person with low self-control (a predisposing trait) is placed in a situation where the opportunity (based on situational and activating factors) to commit a crime is present. However, Gottfredson and Hirschi's general theory of crime has been criticized, amongst other things, for insufficiently developing the opportunity aspect of the theory (Barlow, 1991).

All of these examples of theorizing clearly show the importance of the microsocial level of observation and explanation. In addition, these theories illustrate the necessity of including situational and activating factors in the study of violent events. Reiss and Roth (1993) have suggested that the study of the interactions between the demographic, situational, and spatial factors in violent events is a neglected research area. However considering the complex nature of human interaction, analysing meaningful contextual factors can be problematic. Considering all the possible social situations and possible triggering factors, which factors are important in a violent event? Reiss and Roth recommend attention to characteristics of violent encounters such as the nature of preexisting relationships among the participants, the presence of alcohol or drugs, the presence of individuals who could intervene, the presence of firearms, and the characteristics of the behavioural interaction or exchange between participants. "Improved understanding of these dynamics could lead to preventive interventions to modify high-risk encounters" (Reiss and Roth, 1993, p. 17).

The following sections will discuss research that has examined the contextual factors of violent events. These are the factors "outside the individual that influence the initiation, unfolding, or outcome of a violent event" (Sampson & Lauritsen, 1993, p.30). The initial portions of this section discuss the situational factors. These are the factors, or

states, that are present in a specific social interaction that results in violence. These factors are located in the middle column of the risk factor matrix presented in Table 1. The last section discusses the activating factors. These are transactional factors that may trigger a violent incident. These factors are located in the right column of the risk factor matrix presented in Table 1.

Offender-victim relationship. The relationship between the offender and the victim is an important element because it places the event in a particular social structural context (Sampson & Lauritsen, 1993). Research conducted with Canadian data sources from 1996 has determined that 73% of single accused cases, and 69% of all violent crimes (excluding robbery), involved an offender who was known to the victim (Janhevich, 1998). In considering all violent crimes (excluding robbery), 38% involved friends, 20% spouses/ex-spouses, 11% other family members, 26% strangers, and 5% unknown.

In addition, the gender of the participants involved in violent encounters should also be taken into account (Silverman & Kennedy, 1987; Straus & Gelles, 1986). Recent Canadian data finds that the most common type of violent incident involves a male offender and a female victim. Janhevich (1998) reports that 48% of all violent crimes in Canada in 1996 involved a male offender against a female victim, 39% of cases involved male offenders and male victims, and the remaining 13% of cases involved female offenders (7% female victims, and 6% male victims). The Canadian findings also show that in cases of male against female violence, 11% involved strangers, 87% involved non-strangers (where 46% of the cases involved spouses/ex-spouses, 30% involved friends, and 11% other family members), and 3% unknown. Cases of male against male violence

find 39% involved strangers, 56% involved non-strangers (where 1% involved spouses/ex-spouses, 46% friends, and 9% other family members), and 6% unknown. Thus, both female and male victims are more likely to know their assailant, and cases of stranger violence are most likely to involve male offenders and male victims. Since the majority of violent events involve non-strangers, the findings suggest that interpersonal dynamics are an important consideration in the analysis of violent interactions.

Alcohol and drugs. It is widely assumed that alcohol and drug use are important factors in violent behaviour. Many studies find that alcohol or drug use is associated with violence (for a review see Tedeschi & Felson, 1994, p.197-201). However, much of this research considers only the patterns of alcohol or drug use of the offender, rather than the actual consumption of intoxicants at the time of the violent incident. This views substance abuse as a factor of criminality – a predisposing trait. However, linking a predisposition of substance abuse causally with violent offending is fraught with methodological issues. For example, Sampson and Lauritsen (1993) point out that excessive substance abuse and propensity to violence may be different aspects of an underlying construct such as antisocial behaviour. In other words, excessive substance abuse and propensity to violence may covary as indicators of antisocial behaviour. Therefore, caution must be exercised when a predisposing factor, such as substance use, is linked to a causally complex circumstance like violent behaviour.

Very little research has considered the situational effects of alcohol or drug consumption. Most research, as described above, places the study of intoxicants as a predisposing psychological trait. Some theory, most notably the routine activities theory (Cohen & Felson, 1979), emphasizes the structure of situations that may include the

presence of alcohol or drugs. Routine activities theory looks at the opportunity for crime rather than personal characteristics of offenders. This places the theory at the macrosocial level of observation. The theory suggests that violent offending is most likely to occur in any location (i.e., bars) where those most likely to be involved in violent behaviour (i.e., young men) congregate. In this approach, past use of alcohol or drugs is not an issue. However, this theory cannot link consumption of alcohol causally with violence. Its focus is the fact that it is young men gathering in one location that increases the likelihood of a violent occurrence. The consumption of alcohol is simply a coexisting factor – something that occurs where young men hang out. In addition, a situational analysis of violent events must also include substance use of victims. Felson and Steadman (1983) report victims of homicide were significantly more likely to have been intoxicated with drugs or alcohol than victims of assault, suggesting that the victim's substance use might have affected the behaviour of the offender. However, the role that consumption of substances has at the time of the violent event is an under-researched area.

Presence of a weapon. Sampson and Lauritsen (1993) review the studies that explore the use of weapons in violent crimes. Most of this literature has focused on robbery incidents where the presence of a weapon has been found to be associated with a lower risk of injury; most likely a result of the fact that victims are less likely to resist an armed offender. However, when an injury does occur, the extent of the injury to the victim is likely to be more serious. Once again, a situational analysis of violent events must take the behaviour of the victim into consideration. Felson and Steadman (1983) find that victims of homicide were more likely to have displayed some type of weapon

than were victims of assault, suggesting that the victim's display of a weapon is more likely to result in serious injury or death.

Presence of bystanders. The role of third parties in violent events has received only limited attention in the literature (Sampson and Lauritsen, 1993). Both Felson and Steadman (1983) and Luckenbill (1977) find third parties were more likely to antagonize violent encounters and that third party mediation appears to have no effect. Likely, other contextual factors are important in determining if bystander presence is significant in violent interactions. For example, the relationship of offender and victim, or the presence of weapons might have implications as to whether or not third parties get involved in violent events.

Previous violence between combatants. This area, as well, is an under-researched area in the situational analysis of violent events. Luckenbill (1977) found that in almost half of the homicides studied, the participants had been previously involved in "escalation of hostilities" that sometimes included physical violence. Kennedy and Forde (1998), in their routine conflict approach, suggest that, in violent interactions, individuals refer to response sets or repertoires when determining what action to take. Obviously, using this theory, previous violent encounters with an individual would affect what behavioural outcome is selected.

Activating factors. The final remaining factors to review are the triggers of violent events. At the microsocial level of observation, these factors are the elements of the communication exchange between participants that may affect the outcome of the event. One of the earliest activating factors studied was the role that provocation plays in violent events (Curtis, 1974; Wolfgang, 1957). Wolfgang found that in 26% of the

homicides he studied, the victim precipitated his or her own demise. The most common cases were characterized by a "primary demonstration of physical force by the victim, supplemented by scurrilous language" (p.2). Similarly, Curtis reports that 20% of homicides and 17% of aggravated assaults in 17 major American cities were victim precipitated. In addition, Savitz et al. (1991) report that nearly half of the homicides they studied included a victim that provoked or initiated the conflict. However, once again, violent outcomes are not likely solely determined by the actions of either participant in the event, but multiply determined by the interaction of a number of factors as highlighted in the risk factor matrix.

Conclusion

As can be seen throughout this review, many factors thought salient in violent behaviour have been studied. However, no specific single-factor, whether it is a predisposing trait, situational state, or an activating trigger, fully explains violent outcomes. All elements in the risk factor matrix potentially play a role in violent events. No single level of observation alone is sufficient to fully understand violent encounters. Likewise, no single level is more or less fundamental in explaining violent encounters. Research must endeavor to include multiple elements of the risk factor matrix to discover how the various factors interact to produce violent events. In an attempt to better understand violent outcomes, this thesis project examines conditions from the psychological and microsocial levels of observation. These conditions cover predisposing, situational and activating factors.

Chapter III

Methodology

This chapter will provide a discussion of the methodology used in this thesis. Several topics will be described in the chapter: a) the research setting where the data were collected; b) the questionnaire administered to the participants; c) the research participants and the generalizeability of results; d) the procedures involved in administering the questionnaire; e) ethical considerations; f) the technique of Qualitative Comparative Analysis and the steps involved in conducting this type of analysis; and g) the specific conditions and outcome used in the analysis.

Research Setting

Forensic Assessment and Community Services (FACS) is a community-based program of Alberta Hospital Edmonton, a provincial mental health treatment centre operated under authority of, and funded by, the Alberta Provincial Mental Health Advisory Board. Clients are referred to the clinic from various social agencies and judicial agencies (such as parole/probation officers, or judges) for assessment and possible subsequent treatment. Services are provided for adults and adolescents who have been detained, charged, convicted, incarcerated, granted probation, or paroled under the Criminal Code of Canada. Priority for assessment services is granted to those for whom a court order has been made. Priority for treatment services is granted to those on probation or parole, those with court-ordered treatment conditions, violent and sexual offenders, individuals with serious mental health problems, and those with functional deficits. While all clients must currently be involved in the Canadian Criminal Justice System, they may

be referred for a variety of mental health issues (e.g., depression, schizophrenia, anger management, sexual deviation, etc.).

Materials

The FACS Violence Questionnaire (VQ) contains eight sections that deal with: a) general demographic information; b) juvenile antisocial and violent behaviour; c) family of origin violence; d) adult violent behaviour and contextual factors of the violent incident; e) anger scales; f) marital interaction and satisfaction; g) attitudes about violence; and h) knowledge of anger management techniques. Smaller scales dealing with social desirability, alcohol abuse, and self-esteem are interspersed through the questionnaire.

One specific section of the questionnaire is central to this thesis project. In a series of open and closed-ended questions, the participants were asked to provide answers regarding the violent incident that resulted in their arrest, conviction and subsequent referral to the clinic. In this way, information is gained about specific aspects of the violent event from the respondent's point of view. A sample copy of this section is provided in Appendix A. By studying these contextual components, we may learn which factors are prevalent in violent social interactions. For example, certain questionnaire items relate to situational factors (e.g., presence or absence of weapons or alcohol, or other individuals). Some items query activating factors (e.g., who initiated the episode, provocation). Other items ascertain the events that occur in the aftermath of the incident (e.g., were the police called, did the other person have to go to the hospital). When taken in total, the questions can be assembled into a "story" containing a plot with a beginning, middle and end, characters, and a setting. In other words, the questions in this section

attempt to ascertain some characteristics of the narrative of the violent event that the participant was involved in.

In recalling this narrative, the research participant has the opportunity to give an account of the violent event. Accounts are an important device in that they contain each research participant's interpretation of events. Early research of accounts found that accounts contained justifications or excuses for behaviour (Scott & Lyman, 1968). More recent research suggests that "accounts and other related concepts, such as stories and narratives, represent ways in which people organize views of themselves, of others, and of their social world" (Orbuch, 1997, p. 455). Therefore, accounts of violent events given by individuals involved in these incidents contain valuable information regarding their perceptions about the important conditions, characteristics and transactions of this kind of social interaction.

Certain elements of these accounts, in conjunction with other parts of the questionnaire, can be used to answer important research questions. For example, which elements, or combination of elements, provide the best explanation of violent behaviour: individual traits or contextual aspects of the interaction? It is thought that the criticisms of single-factor, personality based explanations of violence will be supported with the findings that situational and transactional factors will play an important role in the composition of violent events.

Participants

The population of interest in this thesis project is violent men who are involved in the Canadian Criminal Justice System who reside in Alberta. The sample frame of the project is comprised of 464 male violent offenders referred to FACS who completed the

Violence Questionnaire. After a clinical assessment at FACS, clients who were identified by the referring agent as having a problem with violence (for example, violent temper, or difficulties with anger management), or were charged with a violent offense (for example, assault) were asked to complete the questionnaire. The completion of the questionnaire was voluntary and the results are used for the purposes of program evaluation and general criminological and psychological research.

This purposive sample provides a better opportunity to study the characteristics of violent behaviour then do samples of the general population where the base rate of violent behaviour is quite low. However, several concerns must be addressed in regard to this sample frame. The main issue is whether the sample frame is representative of the population. The following discussion presents potential sources of bias in the sample frame.

Fowler (1993) notes that the best way to evaluate a sample is not by the results, or characteristics of the sample, but by examining the process by which it was selected. Over 250 male violent offenders are referred to FACS every year. The referring source is likely to refer a client to FACS, as opposed to another agency dealing with violent men, if there is a concern with mental health issues. In other words, men who present potential mental health issues, such as depression, childhood abuse issues, severe and persistent abusive behaviours, etc., are most likely to be referred to FACS. The referral is made to FACS because, in addition to specialized treatment for the violent offender, the referring source receives a clinical assessment regarding the client. However, if the men referred to FACS are significantly different from other violent men in the criminal justice system, the results of the research could not be generalized to all violent offenders in Alberta. The

extent to which the mental health concerns of the research participants are affecting the research questions is not known. One way to discover the potential selection bias of this sample would be to administer the questionnaire to a sample of violent men referred to another agency and then compare the results of the two groups on the research questions of interest. Hypothetically, mental health issues could aggravate violent interactions, however research in this area has not been conclusive in this matter (Steadman & Felson, 1984).

Another potential source of bias may be the result of clients who are referred to FACS but do not attend. Approximately 20% of men referred to FACS do not comply with their scheduled appointment. It is possible that the men who *do* comply with their initial appointment, and complete a questionnaire, are significantly different from those who *do not* show up for their appointments. Previous research with violent offenders referred to FACS indicates that men who show up for their initial appointment, but who subsequently drop out of treatment before completion, possess different characteristics than those who do not drop out. Men that drop out tend to be younger, less educated, less likely to have stable employment and more likely to have been involved in serious violent and antisocial behaviours (Cadsky & Crawford, 1988). It is not known whether these characteristics are also present in those who do not show up for their initial appointment, but one could hypothesize that this may be the case.

A final biasing element may be introduced by individuals who attend their initial appointment, but who do not complete a questionnaire. Of the approximately 200 men annually who attend their initial appointment, roughly 10% do not complete a questionnaire. The majority of this 10% do not complete the questionnaire because of

poor reading skills or inadequate English language abilities. The remainder (about 2-3%) refuse to participate either outright, or by postponing the administration of the questionnaire and subsequently never returning. The extent to which the exclusion of these individuals from the sample may bias the results is not known. However, it is not likely that the men with poor reading or language skills exhibit systematically different patterns of violent behaviour from the men who complete questionnaires. It is, however, possible that those who refuse to complete the questionnaire are different in relevant ways from the participants. One hypothesis is that those who are uncooperative with the research may have difficulty functioning effectively in social situations. This deficit may be a salient factor in violent interactions. These factors would then be underrepresented in the sample frame.

In summary, two important issues must be considered when deciding if the sample frame is representative of the population. First of all, violent men are referred to FACS because they are seen by the referring source as potentially having mental health issues. It is possible that systematically a certain 'type' of violent offender is referred to FACS. This 'type' of offender may exhibit a different pattern of social interaction in violent situations as compared to violent offenders referred elsewhere. This could only be determined by administering the questionnaire to violent offenders referred to other agencies. Second, not all referrals comply with their appointment or with the administration of the questionnaire. The very factors that give rise to non-compliance may also be factors salient in violent interactions. By not having these factors fully represented in the sample frame, there is a possibility of biased results. However, by the very nature of these individuals, it is not possible to ascertain through survey methods if

there are any relevant differences between them and the sample frame. It is not known to what degree these two issues bias the results. It can only be advised that these issues be taken into account when considering the results of the research project.

Another issue must be taken into account when considering the results. This methodological issue involves the demand characteristics and social desirability of responses that occurs when administering self-report questionnaires, especially to a forensic population. While the findings presented should be interpreted in the light of this issue, Hindelang, et al. (1979) suggest that self-reports are capable of dealing with serious offending behaviour.

Despite the potential sampling biases and the validity of a self-administered questionnaire completed by a forensic clientele, this sample provides a valuable opportunity to better understand violent interactions. Looking at only the violent end of the population spectrum, represented by this group, provides us with important insights about violent events not available in cross-sectional studies of the population. Surveying individuals involved in violent events allows us to examine the factors related to violence in incidents that actually occurred, as opposed to asking research participants to speculate what they would do in a hypothetical violent situation. Asking individuals to provide an account of an actual violent incident provides a wealth of information about the contextual and transactional aspects of violent events.

A final proviso of the sample must be acknowledged. This sample contains mainly participants who are on probation. Therefore, the analysis doe not include interactions that resulted in convictions that received federal sentences (i.e., sentences greater than 2 years). In other words, it cannot be known from this research how

interactions that result in assault differ from interactions that result in homicide. However, previous research has shown that the characteristics of the interaction in homicides and assaults are generally similar (Felson & Steadman, 1983).

Procedure

The following section reviews the procedure for administering the questionnaire, and the issues of risk, benefit and consent from the perspective of the participant. As discussed above, the FACS Violence Questionnaire is administered to clients referred to FACS who have been convicted of violent offenses or who have histories of violent behaviour. At intake, all clients complete a clinical interview with either a psychologist, psychiatrist, or social worker. At the end of the clinical interview, the therapist asks the client if he is willing to complete a questionnaire that will be used for research and program evaluation purposes. If the client is not willing to complete the questionnaire, he is free to leave the clinic without any negative consequences regarding treatment. As mentioned above, of the clients who attend their initial appointment, roughly 10% do not complete a questionnaire.

If the client is willing to complete a questionnaire, he is escorted to the researcher's office where the researcher reads the cover sheet of the questionnaire to the participant (first page of Appendix A). The cover sheet reviews the objectives of the questionnaire, issues of confidentiality and anonymity, and provides several examples of the types of questions the client will encounter. It is also explained to the participant that the questionnaire will not be kept on his clinical file, and that his responses will not be discussed with anyone outside the clinic without his permission. Any questions or concerns that the participant may have are answered at that time, and, once again at this

point, the client may refuse participation without any consequences. The client is then escorted to a large room, offered a cup of coffee, seated at a desk-carrel and allowed to complete the questionnaire in privacy. At any point, if the participant encounters a difficulty in completing the questionnaire, he may ask the researcher for assistance. If the client becomes uncomfortable while completing the questionnaire, he may withdraw his participation and his incomplete questionnaire is shredded. When the respondent completes the questionnaire, the researcher reviews it with him to clarify ambiguous responses, complete missing items and generally debrief the participant. The majority of participants complete the questionnaire in 60-90 minutes.

If the participant is subsequently referred to and completes the FACS Anger Management Group, a post-treatment questionnaire is also administered. This questionnaire re-administers three scales from the intake questionnaire and provides an opportunity for the client to provide feedback about the treatment he received. At this point, both the pre- and post-treatment questionnaires are entered into a database. Although the client writes his name on the questionnaires, it is not entered into the database. Clients are asked to write their names on the questionnaires so that the pre- and post-questionnaires can be easily matched together and entered into the computer. Completed questionnaires are stored in a locked room at FACS. All research applications of the questionnaire occur after data entry, therefore it is not possible to connect the participant's name to any responses on the questionnaire during data analysis.

Ethical Considerations

Risk. There is a minimal chance of risk in that the collection of data through the completion of the questionnaire could produce mental distress for the participant through

the recollection of troublesome events. However, the questionnaire presents no greater risk than the potential for psychological distress present in the clinical interview that the participant completed just before introduction of the questionnaire. After completing the questionnaire, it is reviewed and the participant is given the opportunity to discuss any concerns he may have at that time. If necessary, immediate and/or long term counseling can be arranged for the participant. After more than 700 administrations of the questionnaire (to both men and women), this course of action has not been necessary. The dissemination of results could not produce any physical or mental harm for the participant because no name or identifying mark is connected to the data during analysis.

Benefits. This research has the potential to greatly enhance the understanding of violent events which could, in turn, be used to improve the treatment techniques of anger management programs. Unfortunately, most participants of this thesis project will have completed the FACS Anger Management Group before the anticipated improved clinical interventions can be incorporated. However, participants who continue to attend the clinic long-term, and future clients may directly benefit from improved treatment. Of course, these benefits not only affect the client, but also significant others in his life.

Consent. As discussed above, the client has the opportunity to decline or withdraw participation at any time without penalty. Clients are informed that, although they provide their name on the questionnaire, it is not entered into the database. They are also informed that their name cannot be associated with the information that they provide once it is entered into the computer.

Analysis Strategy

The following section provides an overview of Qualitative Comparative Analysis (QCA) (Ragin, 1987). QCA can be seen as providing a bridge between the more traditional quantitative and qualitative methods. It borrows from both ends of the methodological spectrum, building on the strengths of each method. However, while this method is capable of producing interesting and unique analyses of violent events, its limitations must also be recognized. The following discussion first reviews briefly the fundamental principles of quantitative and qualitative methods, and then provides a detailed description of the principles of QCA.

Methodological standards. In many research circles, experimental design is considered standard methodology. Experimental design compares a group exposed to an experimental treatment with a control group, which only differs from the experimental group in that it did not receive the treatment. In this case, the treatment is the only factor that differentiates the groups; all other conditions are held constant or randomized. If significant differences are found between the groups, the differences are thought to be attributable to the treatment. However, social scientists face unique problems when trying to study social phenomena. First, it is not always possible, or ethical, to manipulate social situations. Next, most outcomes of interest to social scientists have likely more than a single cause. In addition, causes rarely occur in isolation. Most outcomes are a result of a combination of various social conditions that are situated in time and space (Abbott, 1997). Finally, any one specific condition may even have opposite effects on an outcome depending on the context (Ragin, 1987). These issues provide social scientists with unique challenges when conducting research.

To overcome these challenges, social scientists generally employ one of two major methodological strategies – quantitative techniques or qualitative techniques. Each strategy has its own approach for handling the above issues and responding to various research questions. Each approach also has its own advantages and disadvantages (see Ragin, 1987 for a detailed discussion). The following sections review, in broad terms, quantitative and qualitative methods. These sections are not meant as comprehensive reviews of the methods, but rather as "bookends" on the methodological spectrum allowing Qualitative Comparative Analysis to be placed at approximately the midpoint of this spectrum.

Quantitative methods. In general, quantitative methods in the social sciences are concerned with the relationships between social constructs conceived as variables. This process most commonly occurs in a deductive manner. The putative goal of most quantitative studies is to formulate broad generalizations about a population of interest based on a sample of that population. This goal is achieved by testing hypotheses derived from general theories pertaining to the relevant constructs. This variable-orientated method attempts to approximate the rigor of the experimental method through statistical manipulation. While the effect of a causal variable on the dependent variable is estimated, the effect of competing and confounding variables is controlled for statistically. The variable-orientated method culminates in probabilistic statements about a variable's average, net effect across the wide variety of the sample. This enables researchers to generalize the findings to the population of interest at large.

However, these techniques make certain assumptions at the outset about the causal complexity of social phenomena. One assumption of many statistical analyses is

that causation is additive (Ragin, 1987). In other words, the procedures estimate the separate contribution of each cause on the dependent variable. Different causes increase or decrease the probability of a certain outcome independently of one another. Therefore, the effect of a cause is considered the same in all contexts regardless of the contribution of other causal variables. Thus, in the quest for generality, quantitative methods falsely homogenize cases (Griffin et al., 1991). This contradicts the notion, discussed above, that conditions which effect social phenomena rarely occur in isolation from one another and must be considered in context with other conditions. One solution to this problem is to introduce statistical interactions into the analysis. While statistical tests for multiple interactions may respond to this problem, several conditions must be met to render the use of statistical interactions tenable: a) all plausible interactions must be known in advance; b) there can only be a relatively small number of such interactions; and c) the number of cases must be sufficiently high (Ragin, 1987). If these conditions are not met, or as the number of interactions increase, the model may become excessively collinear, or may lack the necessary degrees of freedom. As a result, most quantitative techniques utilize simplifying assumptions (i.e., that variables act independently of one another). In addition, by disaggregating cases into variables and searching for the average, net effect of the independent variables on the dependent variables, the variable-orientated method obscures the identity and particularity of cases. In other words, the information about the particular context in which a social phenomena occurs is not utilized. Traditional quantitative approaches have been criticized for their inattention to the context in which social phenomena occur. On the other hand, the qualitative methods specialize in holistic analyses that emphasize the identity and particularity of cases.

Qualitative methods. The alternative methodological strategy in the social sciences is the qualitative approach. In general, qualitative researchers work with small, specifically defined samples, comparing cases with each other as wholes to arrive at descriptions or careful generalizations about relatively narrow classes of social phenomena. The goal of the qualitative method is usually either to interpret or understand specific cases because of their intrinsic value, or to provide comparative analyses of social phenomena leading to generalized descriptive statements or theories limited to the cases under examination. Qualitative researchers work typically in an inductive manner, using their in-depth knowledge of the particular cases under study to examine the complex combinations of conditions that produce the outcomes of interest. This case-orientated approach applies experimental rigor by identifying comparable instances of a phenomena of interest and then analyzing the important similarities and differences among them (Ragin, 1987). Each case is examined as a whole, cases are compared with each other as wholes, and outcomes are examined as resulting from combinations of conditions.

This attention to the details of individual cases requires a thorough research dialogue between the investigator and the data. However, this strength of the qualitative method also raises some concerns. First of all, qualitative methods have been criticized as susceptible to the subjective biases of the researcher. These biases may be in the selection of cases to include in a study, or in the selective attention to certain aspects of a case to the exclusion of other conditions. The other issue concerns the number of cases a researcher is able to examine. Because of the in-depth knowledge required of each case, and the complexity of social phenomena, qualitative approaches find it difficult to

analyze more than a few cases at a time. Therefore, because of the acknowledged subjectivity of researchers and the limited number of cases in a typical qualitative study, caution must be exercised when making generalizations. The ability to make broad generalizations across a large number of cases is, of course, the strength of quantitative methods.

As can be seen, both quantitative and qualitative methods have specific strengths and weaknesses. Building on the strengths of both methods, Ragin (1987) has proposed a method that selectively unites certain features of the two approaches. This synthesized method, which utilizes Boolean logic and algebra, is called Qualitative Comparative Analysis (QCA). In common with the variable-orientated methods, QCA 1) allows the examination of a large number of cases, 2) allows for the replication of results by different analysts, and 3) has the potential for explanatory generality. In common with the case-orientated procedures, QCA 1) allows for the assessment of complex interactions of conditions, and 2) incorporates the use of context, specificity, and contingency to reach conclusions about the data structure. In sum, this synthetic method attempts to find the middle ground between the worst case scenarios of rote proceduralism or formulaic scientism on the one hand, and ungrounded speculation or thin description on the other (Griffin & Ragin, 1994).

Qualitative comparative analysis. In *The Comparative Method: Moving Beyond Qualitative and Quantitative Strategies* (1987), Charles Ragin described a data reduction technique that utilizes Boolean logic and algebra to simplify complex data structures. The method, Qualitative Comparative Analysis, allows for the examination of the ways in which conditions combine or interact to produce the same or similar outcomes. QCA's

greatest strength lies in its ability to analyze complex combinations of conditions in a holistic manner. The method encourages maximum complexity of causal configurations at the outset. This feature permits the researcher to avoid making simplifying assumptions about the way in which causation occurs. Conditions are not examined one at a time or in terms of their unique contribution to explained variation as in statistical analysis, but as basic elements that define complex configurations. In other words, combinations of conditions are the basic unit of analyses not individual variables. QCA approximates experimental methods by examining all possible combinations of conditions allowing one condition at a time to vary. This method works, using Boolean reduction techniques, to identify the most logical, parsimonious grouping of a set of elements that, taken together, constitute both necessary and sufficient conditions for an outcome to occur.

Ragin (1987, 1989, 1994) and Hicks (1994) discuss several important features of QCA. What follows is a discussion of each of these features with illustrations of the concept using a violent incident as an example.

1. Attention to the case as wholes and as configurations of parts. In QCA, the different parts of the whole case are defined in relation to each other. Cases are not disaggregated into variables and the average effect of each variable estimated across all values of the other variables. Instead, in a Boolean analysis, cases are seen as combinations of parts. The elements of a case are not considered in isolation, but in the context of other relevant elements. These combinations can be interpreted as different situations. "A fundamental principle of holism provides the metatheoretical basis for this way of seeing cases: to alter any single part of a whole, any element, is - potentially at

least - to alter the character of the whole" (Ragin, 1987, p.122). Using a violent outcome to illustrate, no single element of the incident, such as the offender's consumption of alcohol, is considered in isolation. Rather, the presence or absence of the consumption of alcohol is considered with the presence.or absence of other elements of the incident – such as presence or absence of bystanders or the presence or absence of weapons.

2. *Attention to causal conjunctures*. As an extension of the first feature, causal conjunctures means that causes rarely operate in a simple additive fashion. Rather, they usually combine and intersect to produce the outcome of interest. In other words, the effect of any one condition is contingent on the presence or absence of other conditions. QCA assumes maximum causal complexity and examines each possible combination of elements. This complexity is then simplified logically using Boolean algorithms. Each possible combination of conditions is examined, regardless of the number of cases that the combination represents. The analysis organizes every possible combination of elements and determines which combinations result in violent outcomes. These combinations are then reduced, using Boolean algorithms, to their logical minimal components. A hypothetical example of a Boolean solution might look like this: The presence of alcohol *AND* the absence of bystanders *AND* the presence of weapons resulted in a violent outcome.

3. *Attention to causal heterogeneity*. This feature confirms that different combinations of elements often produce the same outcome. For example, the presence of alcohol and the absence of bystanders and the presence of weapons *OR* the absence of alcohol and the presence of an angry temper and the presence of bystanders both resulted in violent outcomes.

4. *Attention to deviating cases and concern for invariance*. QCA is concerned with both exploring deviating cases and the search for generality. There is no such thing as error in QCA - every case resulting in the outcome of interest is accounted for. A case may contain a unique combination of conditions, but this deviation from the common patterns is identified and explained. Thus, the analysis is not frequency based and conclusions are not stated in probabilistic terms. Any given combination of conditions either leads to the outcome of interest or it does not.

5. *Fusion of idiographic and nomothetic modes of explanation*. Ragin presents QCA as a hybrid method in the middle ground between traditional quantitative and qualitative methods. QCA borrows aspects from each end of the methodological spectrum and is represented as a useful complement to both traditional methods. For example, QCA can provide a small-N case-orientated study with a way to systematically analyze the cases, or provide a large-N variable-orientated study with a means to examine complex multiple interactions in the data structure. In addition, QCA can be used in an idiographic manner as a way to interpret data structures or as a data reduction technique, or QCA can be used in a more nomothetic manner to evaluate different causal explanations or to test theories. In sum, QCA is both holistic and analytical in its approach.

The goal of this thesis research is to identify the combination of elements that constitute violent events. A discussion below will review the relevant conditions to be investigated. However, first, the following section provides a brief outline of the steps involved in performing a Boolean analysis.

Conducting a Boolean Analysis

Various steps are followed when conducting a Boolean analysis with QCA (see Drass & Spencer, 1987; Ragin, 1987, 1989 for detailed instructions). First, the Boolean method requires that all conditions and outcomes be dichotomous. A condition or outcome is given a value of '1' if the condition or outcome is present or true in a given case, or a value of '0' if the condition or outcome is absent or false in a given case. The next step is to construct a 'truth table'. The truth table lists, in rows, all possible dichotomous combinations of conditions. Each combination appears only once, regardless of its frequency of occurrence in the data set. The third step involves determining whether each combination of conditions results in an occurrence of the outcome of interest. This is done by associating each configuration with a dichotomous score on the outcome based on the cases with that configuration. Therefore, a combination of conditions is given a score of '1' if the cases that have that particular configuration result in the outcome of interest; or the combination is given a score of '0' if the cases do not result in the outcome of interest. Table 2 (based on an example given in Ragin, 1989) shows a hypothetical Boolean analysis with three dichotomous conditions (W, X, Y) and an outcome (Z). Panel A shows the truth table. The rows in Panel A show each possible combination of the dichotomous conditions W, X, and Y. The fourth column shows the hypothetical outcome associated with each combination of conditions.

Table 2

Hypothetical Example of Boolean Minimization

Panel A. Truth Table

W	X	Y	Z
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

Panel B. Primitive Expressions

0	1	0	1
1	0	1	1
1	1	0	1
1	1	1	1

Panel C. Prime Implicants

1	-	1	1
1	1	-	1
-	1	0	1

Panel D. Prime Implicant Chart

	Primitive Expressions			
Primes	111	101	110	010
1-1	x	x		
11-	x		x	
-10			x	x

Panel E. Reduced Equation

$$Z = 1\text{-}1 + \text{-}10$$

which in Boolean shorthand is

$$Z = WY + Xy$$

The next step in the analysis involves minimizing the truth table. At this point, only combinations that are associated with the outcome of interest are minimized. These combinations are called 'primitive expressions'. Panel B contains the primitive expressions for the hypothetical example. The goal of minimization is to find a set of configurations which logically imply the primitive expressions, but which are simpler and more parsimonious than these original combinations. Therefore, if two primitive expressions are identical in value for every factor but one, the two combinations can be combined into one configuration with the discrepant factor eliminated. For example, in Panel B, inspection of the third and forth rows reveals that conditions W and X are present in both rows, however, condition Y is present in one row and absent in the other. Therefore, condition Y can be eliminated and the two rows can be combined to produce a single, simpler expression. This simpler expression states that if W and X are present, Z results; the value of Y is irrelevant. The reduced expression is represented as 11-, where the dash indicates that a term has been eliminated. However, it should be noted that a condition that is unimportant in certain combinations of factors might well be crucial in other combinations. Boolean minimization continues in this manner until no further reductions can be made to the rows of the truth table. The minimized configurations that remain are called 'prime implicants'. Panel C contains the prime implicants for the hypothetical example.

The generation of prime implicants is the first step in a two step procedure, called the Quine-McCluskey algorithm, used by QCA in minimizing a truth table. The second step involves generating a subset of prime implicants sufficient to imply all primitive

expressions in the truth table. This subset of prime implicants becomes the solution to the analysis.

Often, a prime implicant may imply more than one primitive expression in the truth table, or a primitive expression may be covered by more than one prime implicant (see Panel D). If this is the case, the second stage of the Quine-McCluskey algorithm is carried out to determine the logically, minimal number of prime implicants. This second stage of minimization is conducted using a 'Prime Implicant Chart' which identifies logically redundant prime implicants. The chart is constructed with the prime implicants as rows and the primitive expressions as columns. A mark is placed in a cell in which a prime implicant implies the primitive expression. The basic goal of chart simplification is to select the minimum number of prime implicants needed to cover all primitive expressions in the chart. The QCA program simplifies the Prime Implicant Chart by applying two basic rules (Drass, 1992). First, if a primitive expression is implied by only one prime implicant, that prime implicant must be part of the solution. Once all core prime implicants have been included in the solution, QCA applies the second rule which is to remove all redundant prime implicants. Redundant prime implicants are ones which cover a subset of the configurations implied by another prime implicant.

The second stage of the Quine-McCluskey algorithm is not necessary, but is conducted to produce the most parsimonious results. Panel D contains the hypothetical prime implicant chart. In this example, the middle prime implicant is redundant because both primitive expressions that it implies are covered by the other prime implicants. Therefore, the middle prime implicant can be eliminated. After this second stage of

minimization, the configurations that remain make up the most logically, minimal Boolean solution.

Boolean solutions are often presented using Boolean nomenclature. In Boolean algebra, an upper case letter indicates presence of a condition, a lower case letter refers to the absence of a condition, addition refers to the logical operator *OR*, and multiplication refers to the logical operator *AND*.

Continuing with the hypothetical example in Table 2, Panel E shows the final solution for the example. In Boolean shorthand, the solution is Z = WY + Xy. This equation states that there are two combinations of conditions that result in the presence of Z: the presence of W *AND* the presence of Y, *OR* the presence of X *AND* the absence of y. At the conclusion of a Boolean analysis, the configurations that remain (i.e., the logically, minimal prime implicants) contain two important kinds of information (Drass, and Spencer, 1987):

1. The simplified configurations summarize the core combinations of conditions that are *always* associated with the specified value of the event outcome;
2. The simplified configurations also summarize the unique ways in which conditions *combine* for this value of the event outcome.

Selection of Conditions

Qualitative Comparative Analysis has a strong inductive element because it proceeds from the bottom up, simplifying the complexity of the data in a systematic, stepwise manner. However, it also has a deductive element because it works with specific theoretical constructs, working to provide the logically most minimal combinations of conditions representing those constructs. The epistemology of QCA is based on assessing

the complex combinations of conditions that produce outcomes of interest. Because of the combinatory manner of this method, any one condition is typically part of an explanation that includes other conditions. Therefore, when choosing conditions to examine with QCA, one must keep in mind the combinatory nature of this method.

Amenta and Poulsen (1994) assert that the selection of elements to be investigated in a Qualitative Comparative Analysis is crucial. They suggest several approaches in choosing conditions. The first method is the 'comprehensive approach'. In this approach, all potential causal conditions of the outcome of interest are included in the analysis. This method has the advantage of avoiding potentially misleading results that may occur by excluding from the analysis any relevant causal conditions of the outcome. However, the comprehensive approach can also generate results of uncertain meaning. As the number of possible conditions of a outcome increases, the number of combinations of conditions increases exponentially. For example, including four conditions in an analysis implies 2^4 or 16 possible combinations. However, including 10 conditions implies 2^{10} or 1024 possible conditions. Unless the data set contains an extremely large number of cases, having a large number of conditions in the analysis will likely mean that most possible combinations of conditions will not have any cases to support them. Thus, if the number of combinations is relatively high compared to the total number of cases, the configurations cannot be easily reduced to compact causal combinations. Therefore, the comprehensive approach to selecting conditions does not work well for outcomes with many potential causal conditions.

A related strategy for choosing conditions is the 'perspectives approach' (Amenta & Poulsen, 1994). This strategy attempts to rectify the problems of the comprehensive

approach by selecting for analysis only one or two conditions from each of the dominant theories in the subject area. The approach is designed to minimally cover all perspectives, yet confine the analysis to a reasonable number of conditions. Provided that there are not too many perspectives in the subject area, this method of selecting elements has the advantage of working with strong theoretical foundations, as well as testing the relevance of each perspective. However, this approach also has its limitations. The major drawback is that only a couple of conditions from a few perspectives are generally utilized in an analysis. This means that there is a risk of disregarding some conditions or perspectives and producing results that are, at best, biased, or at worst, incorrect. Therefore, the perspective approach, like the comprehensive approach, does not work well in subject areas with many theoretical positions.

A third approach to selecting conditions identified by Amenta and Poulsen (1994) is the 'significance approach'. In this approach, only conditions that have proven significant using statistical methods are selected for analysis with QCA. This approach works by using explicit standards to reduce the number of conditions to be chosen for analysis. However, this approach runs contrary to QCA's epistemology of combinations. Selecting only conditions that are significant in statistical research, which typically views causation as additive, may result in the exclusion of conditions that are statically insignificant, but are important to the outcome in combination with other conditions.

A related approach is the 'second look approach' (Amenta & Poulsen, 1994). This method of selecting conditions suggests including conditions in a Qualitative Comparative Analysis that have been previously rejected as insignificant by statistical analyses. This approach acknowledges that conditions often combine and interact to

produce outcomes of interest in ways that statistical approaches do not take into account. The disadvantage of this approach is that one must determine which elements receive a reprieve. Unless some logic is used in deciding which elements to re-analyze, the second look approach will eventually develop into the comprehensive approach, where any and all conditions are included in the analysis. Therefore, as suggested, what is necessary is an approach that takes into account the combinational nature of QCA.

The final approach that Amenta and Poulsen (1994) suggest for selecting conditions in QCA, and the approach that they advocate, is called the 'conjunctural theory' approach. This approach expects that conditions combine and interact in a complex manner to produce the outcome of interest. Therefore, conditions are selected for analysis based on the relevant ways in which they are thought to combine and interact. This approach takes advantage of QCA's ability to produce conjunctural results that are causally heterogeneous. Therefore, using this conjunctural approach to selecting conditions, a researcher can determine in what combinations a single condition is salient, or may also use the method to test a theory that is combinational in nature. In sum, using this fifth approach fits best with the epistemology of QCA which emphasizes causally conjunctural and causally heterogeneous results.

Conditions selected. Selecting conditions for a Qualitative Comparative Analysis of violent events poses some problems. Considering the large number of conditions of violent behaviour that have been researched in the past, identifying a single set of salient conditions is difficult. Likewise, few, if any, theories in the violence literature exist that treat violent outcomes as the combination of conditions. With this in mind, conditions

included in the current analysis are hypothesized to combine or interact in complex ways to produce violent outcomes that are conjunctural and causally heterogeneous in nature.

The questionnaire administered to the participants is able to cover several cells in the risk factor matrix discussed in Chapter I, Table 1. The conditions are selected for their ability to represent both the psychological and microsocial levels of explanation. In addition, conditions are selected that represent the predisposing, situational and activating factors in violent events. It is not meant to be suggested that the selected conditions are definitive measures of the constructs represented in the cells of Table 1. Rather, each condition is meant as a representation of a particular cell. Table 3 presents the conditions used in the analysis and their location on the risk factor matrix. These six conditions will be analysed using QCA to determine in which ways and in how many different ways they combine to produce the outcome of interest.

Table 3

Conditions Selected for Qualitative Comparative Analysis of Violent Events

	Level of Explanation	Proximity to Violent Event	Condition (Section and number in questionnaire)
A.	Psychological	Predisposing	"Do you find you get angry very easily?" (D10)
B.	Psychological	Situational	"Were you stone cold sober at the time of the incident?" (D36)
C.	Psychological	Situational	"Was the other person stone cold sober at the time of the incident?" (D37)
D.	Microsocial	Situational	"Was there any violence between you and the other person in the past?" (D43)
E.	Microsocial	Situational	"Were other people present when the incident happened?" (D44)
F.	Microsocial	Activating	"Do you think you were provoked?" (D34)
Outcome of interest			
G.	"How much physical harm did you do?" (D30)		

Chapter IV

Results

This chapter will provide the results of a Qualitative Comparative Analysis of violent events resulting in physical harm to the victim. The analysis follows the four steps delineated in the previous chapter on conducting a Boolean analysis. In addition, this chapter extends the analysis beyond these four simple steps to include the results of two additional analyses that further attempt to ascertain the most minimal, parsimonious Boolean solution. However, before describing the three separate analyses and their subsequent results, the following section will briefly highlight some demographic characteristics of the sample.

Demographic Characteristics of Sample

As described in the previous chapter, the participants in this research project are 464 men referred to a community-based forensic mental health clinic. Table 4 depicts several basic demographic characteristics of the sample.

Table 4

Selected Demographic Characteristics of the Sample

Variable	N	Range	Mean	Std Dev.
Age (years)	464	18-72	32.98	10.11
Education (years)	463	3-22	11.47	2.47
Income (annual $k)	399	0-120	27.11	23.41
# Violent Offenses	435	0-9	1.91	1.57
# Total Criminal Offences	435	0-50	4.57	5.61

Table 4 (continued)

Marital Status (N=463)	single	29.2 %
	married / C-L	47.1 %
	divorced	8.6 %
	separated	15.1 %
Employment Status (N=445)	full time	60.4 %
	part-time	6.1 %
	casual / temp	7.4 %
	unemployed	26.1 %

Analysis #1 – The Unmitigated Analysis

This initial analysis provides a straightforward Boolean analysis of the data set. As discussed in the previous chapter, six conditions and one outcome were selected for analysis. The first step in Boolean analysis involves assuring that all the conditions and the outcome are dichotomously scored. Only one condition and the outcome required recoding. Condition A, "Do you find you get angry very easily?", was recoded where the response "never" was scored as "0" and the responses "sometimes", "often", and "very often" were collapsed into the score of "1". The outcome, "How much physical harm did you do?" was similarly recoded by scoring the response of "none" as "0" and collapsing the responses "a little", "a fair bit" and "a lot" into the score of "1". Table 5 contains the univariate statistics for the dichotomized conditions and outcome.

Table 5

Univariate Frequencies for the Conditions and the Outcome

Code	Condition/Outcome	Absent	Present
A.	Get angry easily	116 (26.0%)	330 (74.0%)
B.	Respondent sober	255 (55.1%)	208 (44.9%)
C.	Other person sober	164 (36.2%)	289 (63.8%)
D.	Previous violence	288 (62.6%)	172 (37.4%)
E.	Others present	191 (41.2%)	273 (58.8%)
F.	Provoked	114 (25.6%)	332 (74.4%)
G.	Physical harm	201 (43.4%)	262 (56.6%)

The next step involves constructing a truth table. Since this analysis contains six conditions, there are 2^6 or 64 different possible combinations of these conditions. Forty eight cases had one or more conditions missing and were excluded from the analysis leaving 416 cases in the truth table. Appendix B contains the complete truth table of this initial analysis. The truth table contains six configurations with positive outcomes (all cases in each configuration result in the outcome of interest), four configurations with negative outcomes (all cases in each configuration do not result in the outcome), 44 configurations with contradictory outcomes (some individual cases in each configuration result in the outcome, some cases do not), and 10 configurations with no cases associated with them. Table 6 shows the primitive expressions for this analysis. The primitive expressions are the configurations where all cases in the configuration result in the outcome of interest (i.e., physical harm to the victim).

Table 6

Primitive Expressions of the Truth Table

Condition						Outcome	
A	B	C	D	E	F	G	Number of Cases
1	1	0	1	1	1	1	3
0	1	0	1	0	1	1	1
1	0	1	1	0	0	1	3
1	0	0	0	0	1	1	11
0	0	0	0	1	0	1	1
0	0	0	1	0	0	1	1

As can be seen in Table 6, the analysis results in six primitive expressions indicating the outcome of interest. These six configurations represent a total of 20 cases in the truth table. Inspection of the primitive expressions reveals that they cannot be reduced further using Boolean minimization. Therefore, these configurations represent the outcome of the Boolean analysis. In Boolean shorthand, the solution can expressed as:

G = A B c D E F +
a B c D e F +
A b C D e f +
A b c d e F +
a b c d E f +
a b c D e f

Legend
A = Angers easily
B = Respondent sober
C = Victim sober
D = Previous violence
E = Others present
F = Provoked
G = Physical harm to the victim

Inspection of the solution reveals that no single condition or partial combination of conditions is sufficient for the solution to occur. In addition, while all conditions are included in the solution, no single condition is necessary for the outcome to occur. In other words, no condition, in either dichotomous state, is present in all configurations.

This equation represents the pure or unmitigated solution of the analysis. Only non-contradictory configurations that singularly indicate the outcome of interest are included in the analysis. However, the 20 cases that are used in this initial analysis represent only 8% of the cases in the truth table with the outcome of interest. In fact, the solution is simply the six primitive expressions. The procedure was not able to reduce the data structure because most of the configurations were not included in the analysis. (Recall that only configurations that result in the outcome of interest, the primitive expressions, are included in the analysis.) A large number of configurations in the truth table contain contradictory cases (refer to final column in Appendix B). In these configurations, some cases result in the outcome of interest, but some cases do not. Ragin (1987) proposes that every attempt be made to capture as many configurations in the analysis as is reasonably possible. "This approach would be consistent with a general goal of allowing greater complexity" (Ragin, 1987, p. 116). The next section discusses the procedures undertaken to include more configurations in the analysis in an attempt to reach a more parsimonious solution.

Analysis #2 – Revising The Truth Table

One method to increase the number of configurations captured in the analysis is to determine if any of the contradictory configurations can be recoded. If the number of cases in the data structure is large, Ragin (1987) suggests using frequency or statistical criteria to determine if the contradictory configurations can be recoded into positive (1) or negative (0) outcomes. This procedure views each contradictory configuration as having a probability of a positive outcome. For example, if a contradictory configuration contains seven cases with a positive outcome and three cases with a negative outcome,

the probability of a positive outcome is 70%. The probability of a positive outcome for each contradictory configuration is then compared against a substantively meaningful probability defined as a standard. Ragin suggests using the probability of a positive score of the outcome of interest across all cases in the data set as the standard. If the observed probability of a positive outcome of a contradictory configuration is significantly greater than the expected standard, the configuration is recoded as a positive outcome. If the observed probability of a positive outcome of a contradictory configuration is significantly less than the expected standard, the configuration is recoded as a negative outcome. If the observed probability of a positive outcome of a contradictory configuration is not significantly different from the expected standard, the configuration is left coded as a contradiction. Ragin suggests using a high cutoff value (e.g., significantly different at the 0.33 level) to maximize the number of contradictions that can be recoded and thus used in the analysis. Put simply, recoding the truth table involves determining if a contradictory configuration is showing a clear tendency towards a positive or negative outcome, and then simply changing the outcome code of the configuration accordingly.

Reviewing Table 5 above reveals that the outcome of interest, physical harm to the victim, occurred in 56.6% of all cases in the data set. This figure is then set as the substantive standard in which to compare the observed probability of a positive outcome in the contradictory configurations. Table 7 shows selected rows of the initial truth table found in Appendix B. As can be seen, some configurations result in the outcome of interest (coded 1), some configurations do not result in the outcome of interest (coded 0), and some configurations have contradictory results (coded C).

Table 7

Selected Rows of Initial Truth Table

	Combination						Outcome				
							0 Cases		1 Cases		Output
Row	A	B	C	D	E	F	Freq.	%	Freq.	%	Code
6.	1	1	1	1	1	0	5	71	2	29	C
7.	1	0	0	1	1	1	4	25	12	75	C
8.	1	0	0	0	0	1	0	0	11	100	1
15.	1	0	1	0	1	1	10	42	14	58	C
17.	1	1	0	1	0	1	4	80	1	20	C
23.	1	0	0	1	0	1	1	11	8	89	C
31.	0	0	0	0	0	0	2	100	0	0	0
38.	0	0	0	0	0	1	5	50	5	50	C
39.	1	1	0	1	1	1	0	0	3	100	1
50.	0	1	0	0	0	0	1	100	0	0	0

Each contradictory configuration has an observed probability of a positive outcome. For example, row #6 has a 29% probability of a positive outcome. This observed probability is then compared to the expected probability for a positive outcome across all cases (i.e., 56.6%). The two probabilities are compared using the Binomial Test procedure in SPSS. The Binomial Test procedure compares the observed frequencies of the two categories of the contradictory configuration to the frequencies expected under a binomial distribution with a specified probability parameter (SPSS, 1998). Therefore, in row #6 of Table 7, the observed probability of a positive outcome of 29% was compared to the expected standard probability of 56.6% using the Binomial Test procedure. The two probabilities were found to be different at the .133 significance level. This significance value is below the .33 cutoff value suggested by Ragin, therefore the

configuration can be recoded. Since the observed probability is less than the expected probability, the configuration is recoded as a negative outcome.

Each contradictory configuration in the initial truth table found in Appendix B was subjected to this procedure and recoded if appropriate. The revised truth table is presented in Appendix C, and selected rows from this revised truth table are presented in Table 8. Contradictory configurations that were recoded to negative outcomes are coded R0, and contradictory configurations that were recoded to positive outcome are coded R1.

Table 8

Selected Rows From The Revised Truth Table

	Combination						Outcome					
							0 Cases		1 Cases		Sig.	Output
Row	A	B	C	D	E	F	Freq.	%	Freq.	%	(1-tailed)	Code
6.	1	1	1	1	1	0	5	71	2	29	.133	R0
7.	1	0	0	1	1	1	4	25	12	75	.107	R1
8.	1	0	0	0	0	1	0	0	11	100	-	1
15.	1	0	1	0	1	1	10	42	14	58	.517	C
17.	1	1	0	1	0	1	4	80	1	20	.116	R0
23.	1	0	0	1	0	1	1	11	8	89	.047	R1
31.	0	0	0	0	0	0	2	100	0	0	-	0
38.	0	0	0	0	0	1	5	50	5	50	.454	C
39.	1	1	0	1	1	1	0	0	3	100	-	1
50.	0	1	0	0	0	0	1	100	0	0	-	0

The revised truth table contains 13 configurations with positive outcomes, 12 configurations with negative outcomes, and 29 configurations with contradictory outcomes. The primitive expressions for this revised truth table are the 13 configurations with positive outcomes. Using Boolean minimization techniques, these 13 primitive

expressions can be reduced into eight prime implicants. The reduction of the primitive expressions into prime implicants is the first stage of the Quine-McCluskey algorithm. Table 9 displays the prime implicants for the revised truth table with the associated number of cases that each function represents.

Table 9

Prime Implicants For Revised Truth Table

	Prime Implicants A	B	C	D	E	F	Number of cases
1.	1	0	0	-	-	1	71
2.	-	0	0	0	1	-	49
3.	1	0	-	1	1	1	29
4.	1	-	0	1	1	1	19
5.	0	-	0	1	0	1	8
6.	-	0	0	1	0	1	16
7.	0	0	0	1	0	-	8
8.	1	0	1	1	0	0	3

The total number of cases that are now included in the analysis reaches 113 or 51% of the cases with the outcome of interest. Most of the prime implicants in Table 9 imply more than one primitive expression. At this point, the second stage of the Quine-McCluskey algorithm can be applied to eliminate any redundant prime implicants. This second stage of minimization eliminates the sixth prime implicant of Table 9 because its primitive expressions are covered by other prime implicants (see Prime Implicant Chart in Appendix D). Therefore, the minimized solution, in Boolean shorthand, is:

G = A b c F +
b c d E +
A b D E F +
A c D E F +
a c D e F +
a b c D e +
A b C D e f

Legend
A = Angers easily
B = Respondent sober
C = Victim sober
D = Previous violence
E = Others present
F = Provoked
G = Physical harm to the victim

Once again, the solution reveals that no single condition or partial combination of conditions is sufficient for the solution to occur. In addition, while all conditions are included in the solution, no single condition is necessary for the outcome to occur. In other words, no condition, in either dichotomous state, is present in all configurations.

Recoding contradictory configurations has allowed many more cases that have the outcome of interest to be included in the analysis. However, the revised solution cannot be considered a pure or unmitigated solution. Some cases that originally did not result in the outcome of interest have been recoded as positive outcomes because a significant number of other cases with the exact same combination of conditions did result in the outcome of interest. Conversely, some cases that originally did result in the outcome of interest were recoded as negative outcomes because a significant number of other cases with the exact same combination of conditions did not result in the outcome of interest.

Ragin suggests one further procedure that allows even more cases in the truth table to be included in the analysis. This procedure involves recoding the remaining contradictory configuration as positive outcomes if they are able to help further the minimization process. The next section discusses the procedures in using the contradictory configurations in the analysis.

Analysis #3 – Using Contradictory Configurations

The use of contradictory configurations in the analysis is indicated if the goal of the analysis is to produce the most minimal, parsimonious combination of conditions that indicate the outcome of interest. This procedure attempts to include a maximal number of combinations of conditions in the analysis. To achieve this goal, the procedure takes each contradictory configuration and determines if the configuration can help factor an expression into a simpler form. If the configuration helps to produce a more minimal solution, it receives an output coding of "1"; if the configuration does not help to further reduce the equation, it receives an output coding of "0" (Ragin, 1987). Obviously, this procedure makes certain assumptions about the contradictory configurations that are eventually included in the analysis. It must be assumed that the outcome of interest is *possible* for these configurations even though a positive outcome is not clearly evident in the truth table.

Eighteen prime implicants are produced by utilizing contradictory configurations to help minimize the expressions. This is the first step in the Quine-McCluskey algorithm. The second step involves generating a subset of prime implicants that imply all primitive expressions with the outcome of interest. Generating a subset of prime implicants is achieved using the Prime Implicant Chart shown in Appendix E. The chart is constructed with the 18 prime implicants as rows and the 13 primitive expressions as columns. A mark is placed in a cell in which a prime implicant implies the primitive expression. The basic goal of chart simplification is to select the minimum number of prime implicants needed to cover all primitive expressions in the chart. This subset of prime implicants becomes the solution of the analysis.

The QCA program simplifies the Prime Implicant Chart by applying two basic rules (Drass, 1992). First, if a primitive expression is implied by only one prime implicant, that prime implicant must be part of the solution. Once all core prime implicants have been included in the solution, QCA applies the second rule which is to remove all redundant prime implicants. Redundant prime implicants are ones which cover a subset of the primitive expressions implied by another prime implicant. Applying these two rules to the Prime Implicant Chart in Appendix E results in the following minimal, parsimonious solution:

G = b c F +
A D E F +
a c e F +
b c d E +
b D e f

Legend
A = Angers easily
B = Respondent sober
C = Victim sober
D = Previous violence
E = Others present
F = Provoked
G = Physical harm to the victim

The final solution can also be expressed in the following manner:

1. b c F +
Physical harm to the victim resulted when – the offender was not sober *and* the victim was not sober *and* the offender feels he was provoked … *or*

2. A D E F +

Physical harm to the victim resulted when – the offender indicates he gets angry easily *and* there was previous violence between the offender and victim *and* there were bystanders present *and* the offender feels he was provoked … *or*

3. a c e F +

Physical harm to the victim resulted when – the offender indicates he does not get angry easily *and* the victim was not sober *and* there were no bystanders present *and* the offender feels he was provoked … *or*

4. b c d E +

Physical harm to the victim resulted when – the offender was not sober *and* the victim was not sober *and* there was no previous violence between the offender and the victim *and* there were bystanders present … *or*

5. b D e f

Physical harm to the victim resulted when – the offender was not sober *and* there was previous violence between the offender and the victim *and* there were no bystanders present *and* the offender feels he was not provoked.

This solution represents 140 or 63% of the total cases with the outcome of interest. Once again in this final analysis, the solution reveals that no single condition or partial combination of conditions is sufficient for the outcome to occur. In addition, while all conditions are included in the solution, no single condition is necessary for the outcome to occur. In other words, no condition, in either dichotomous state, is present in all configurations.

However, certain assumptions were made to reach this solution. The procedure used six contradictory configurations to help the minimization process. Therefore, it is assumed that these six contradictory configurations have positive outcomes. Table 10 shows the contradictory configurations assumed to have positive outcomes.

Table 10

Contradictory Configurations Assumed to Have Positive Outcomes

	Combination						Outcome			
							0 Cases		1 Cases	
Row	A	B	C	D	E	F	Freq.	%	Freq.	%
1.	0	0	0	0	0	1	5	50	5	50
2.	0	1	0	0	0	1	1	50	1	50
3.	1	1	1	1	1	1	9	41	13	59
4.	0	0	0	1	1	1	4	44	5	56
5.	0	0	1	1	0	0	1	50	1	50
6.	1	0	0	1	0	0	1	33	2	67

Summary

This chapter has provided the results of a Boolean analysis of violent events that result in physical harm to the victim. Three different analyses were conducted and the results of each analysis presented. The first analysis minimized only the configurations of conditions that singularly indicated the outcome of interest. The second analysis minimized the configurations of conditions that singularly indicated the outcome of interest, as well as the configurations that suggested the outcome of interest. The final analysis minimized the configurations that singularly indicated, as well as the configurations that suggested the outcome of interest, but it also included several contradictory configurations in the analysis because they were helpful in reaching a simpler, more parsimonious solution.

Appendix F presents the final solution for each of the three analyses. Careful inspection of each solution reveals that the configurations in the third solution are subsets

of configurations in the second solution which, in turn, are subsets of configurations in the first solution. For example, the first configuration in the third solution, *b c F*, is a subset of *A b c F* in the second solution, which is a subset of *A b c d e F* in the first solution. Similarly, the second configuration in the third solution, *A D E F*, is a subset of *A b D E F* and *A c D E F* from the second solution, and *A c D E F* is a subset of *A B c D E F* from the first solution. The third configuration from the third solution, *a c e F*, is a subset of *a c D e F* of the second solution which is a subset of *a B c D e F* of the first solution. The fourth configuration of the third solution, and the second configuration of the second solution, *b c d E*, are a subsets of *a b c d E f* of the first solution. And finally, the fifth configuration of the third solution, *b D e f*, is a subset of *A b C D e f* of the second solution and *a b c D e f* of the first solution which is also a superset of the sixth configuration of the second solution, *a b c D e*.

Chapter V

Discussion

This final chapter will provide a review of the results and a discussion of the method and its utility in analyzing violent events in light of extant literature. The discussion reflects on the ability of the chosen research methodology to handle the research objective and on the strengths and weakness of this type of analysis. The chapter ends with directions for further research and conclusions of the research project.

Synopsis of the Analyses

An investigation of violent events that result in physical harm to a victim was conducted using three different strategies of Qualitative Comparative Analysis. The three strategies differ in various aspects. First, the three strategies differ in the degree of certainty that can be made regarding their results; second, the strategies differ in the degree of diversity and generalizability that can be made; and finally, they differ in the extent of minimization that occurs.

The first analysis provides the most conservative results. This strategy analyzes only the configurations of conditions that result, without contradictory cases, in the outcome of interest. By limiting the analysis to these confirmatory cases, the solution represents a true or unmitigated result. The problem with this analysis is that few configurations result in the outcome of interest with absolute certainty. By limiting the analysis to only these configurations, the analysis is also limited in diversity. Similarly, because the analysis does not represent a wide range of cases, the generalizability of the results is in question. Since only six configurations, representing 20 cases, were involved in this first analysis, the Boolean procedure was not able to minimize the configurations

beyond the primitive expressions. Therefore, the final solution is the six configurations of six conditions. To its credit, the first analysis provides an unmitigated solution. However, this solution lacks in diversity and generalizability, and does not present a reduced solution of the data structure.

The second strategy attempts to rectify the problems of the first strategy by including more configurations in the analysis. This is accomplished by recoding configurations that do not, with absolute certainty, result in the outcome, but do show a clear tendency towards either a positive or negative outcome. The recoding is accomplished by testing each contradictory configuration and determining if the cases in the majority represent a significant majority. If this is the case, the configuration is recoded in the direction represented by that majority of cases. As expected, by adding these recoded configurations to the original configurations that result in the outcome with certainty, the number of configurations included in the analysis increases substantially. Therefore, this strategy succeeds in achieving greater diversity and generalizability of results. The analysis now includes 13 configurations, representing 113 cases, which, using Boolean reduction techniques, can be further minimized. The final solution of the second strategy contains two configurations with four conditions, four configurations with five conditions, and one configuration with six conditions. However, this strategy comes with some theoretical costs. As a result of recoding some configurations, some cases are included in the analysis that originally had negative outcomes but now are assumed to have positive outcomes. Likewise, some cases that originally had positive outcomes are assumed to have negative outcomes in the recoded configuration. By revising the truth table, the cases in the minority in a contradictory configuration are

considered to be in "error" and are recoded. Therefore, the solution no longer represents an unmitigated result, but represents a *likely* result; one that would have occurred if the configurations that originally were contradictory did not contain cases in "error".

The third strategy continues the pursuit of a simpler, parsimonious solution by including as many configurations as possible in the analysis. In this strategy, the analysis utilizes the configurations that result in the outcome of interest with certainty, as well as the originally contradictory configurations that were recoded as having positive outcomes in the second analysis. But, this third analysis also includes some configurations where no clear outcome is determinable. The procedure checks each remaining contradictory configuration to see if the configuration is able to help further minimize the function. If a contradictory configuration is able to help in minimization, it is included in the analysis. Using this strategy, six contradictory configurations are included in the analysis. By including these contradictory configurations, 18 prime implicants, representing 140 cases, are included in the analysis. Because a large majority of the cases are represented in the analysis, the results can be considered to be more diverse and generalizable than the previous strategies. In addition, the procedure was able to notably minimize the expression into a simpler form. For this third strategy, the final minimized solution contains one configuration with three conditions, and four configurations with four conditions. However, this procedure also exacts a theoretical cost. First, as in the second strategy, the same assumption must be made of the recoded configurations (i.e., they likely result in positive outcomes). Second, the six contradictory configurations that were included in the analysis to help the minimization process must be assumed to have

positive outcomes. For these latter contradictory configurations, a positive outcome must be assumed to be *possible*, even though this is not clearly evident in the truth table.

Each of the above strategies is a valid application of Qualitative Comparative Analysis, as described by Ragin (1987), a recognized authority in QCA. The selection of the solution that is ultimately utilized depends on the level of certainty, diversity, generalizability and minimization that the researcher is trying to achieve or is most comfortable with. Obviously, the first strategy, by not making any assumptions, provides the most conservative results. However, with this current data set, this strategy is not able to take advantage of Boolean techniques of minimization. The final solution for the first strategy is simply the six configurations of conditions that result in the outcome of interest without contradiction. Simple visual inspection of the truth table would provide the same results. The second strategy makes some cautious assumptions. With a degree of certainty, this strategy recoded some configurations. The degree of certainty associated with the results can be altered by changing the significance of the cutoff level of the Binomial Test. A smaller significance cutoff level would decrease the number of recodes, but would increase the level of certainty associated with the configurations that were recoded. Conversely, a larger significance cutoff level would increase the number of recodes, but decrease the level of certainty that could be made about the results. The third strategy makes the greatest assumptions about the data structure. Not only does it assume that recoded configurations have a positive outcome, it also assumes that some clearly contradictory configurations also have positive outcomes. If precision is required in the solution, this strategy would not be appropriate. However, if the goal of the researcher is to discover what kinds of configurations are possible, this strategy could be useful.

Ultimately, the researcher is in control of the decisions made about the course of the analysis. While assumptions about the nature of the data may be made, they are made consciously by the researcher, not by the method.

Revisiting the Research Questions

In the first chapter, three research questions were posed. What response to these research questions does the analysis allow? The first question inquires as to which combination of predisposing factors, situational factors and activating factors bring about violent outcomes. In short, it appears that several different configurations of different conditions result in violent outcomes. As reported in the previous chapter, for each analysis strategy, several combinations of conditions result in the outcome of interest. Depending on the degree of assumption one is willing to make, each set of results could be considered the "final" solution. However, using Boolean minimization techniques, and certain assumptions, the third strategy contains a simplified, parsimonious subset of configurations that imply a positive outcome. Thus, the third solution could represent a set of essential configurations that can be seen as the core configurations containing the core conditions that result in physical harm to a victim for this sample of violent offenders. However, it is possible that certain essential configurations and conditions were dropped from the equation in the attempts to reach the most simplified solution. Again, in response to the first research question, cautious interpretation can only state that the third solution represents the possible core configurations of conditions that lead to physical harm to a victim.

The second research question asks which conditions are most important in violent outcomes. A review of the results reveals that no single condition is necessary to any of

the three solutions. That is, no condition, in either dichotomous state, is present in all configurations in a solution. This confirms the view that violent behaviour is a complex phenomena and that research must reach beyond focusing on a single factor. However, in the third solution, two conditions appear in only one of their dichotomous states. The conditions concerning the sobriety of the respondent and the sobriety of the victim only appear in the "absent" state. In other words, if sobriety was a factor in a configuration, it was that either the respondent or victim was not sober at the time of the violent incident. Therefore, the lack of sobriety might be a factor in some violent interactions. It must be emphasized though that neither of these conditions appear in all configurations of a solution. All other conditions have both dichotomous states represented in the solutions. Therefore, no single condition is part of all violent interactions in this research sample.

The final research question asks if different combinations of conditions produce violent outcomes. All three solutions show more than one configuration of conditions. This emphasizes the heterogeneity of violent incidents. Several combinations of conditions are required to understand violent outcomes. This finding challenges other methods that identify a single model that best fits the data.

On the whole, the results demonstrate two important features in the analysis of violent events. First, the importance of including conditions from more than one cell of the risk factor matrix. The current results include conditions representing multiple cells of the risk factor matrix. Conditions representing psychological traits, psychological states, situational elements and activating elements are all part of various configurations resulting in the outcome of interest. The second feature is the importance of considering that conditions do not act independently, but interact with each other in complex ways.

This analysis shows that combinations or interactions of conditions result in violent outcomes.

Keeping Conditions in Context

One of the advantages of QCA is that it allows the conditions to remain in context. The case is not disaggregated into parts and each part scrutinized separately. Instead, each configuration, which represents one or more cases, is compared to all other configurations. In this way, we can gain understanding about the ways conditions interact with each other to produce outcomes of interest. What makes a certain condition relevant in one setting and not in another is the fact that its importance is altered by the presence or absence of other conditions (Ragin, 1987). In other words, the effectiveness of a condition is altered by the context.

This encourages thinking about cases as wholes, as interpretable combinations of parts. Ideally, the interpretation of the configurations can lead to the creation of theories that further our understanding of violent events. These theories would be conjunctural in nature, viewing outcomes as the combinations of conditions. This kind of theorizing would encourage the shift to including factors in research that influence the criminal event (such as situational and activating factors), rather than just concentrating on the criminogenic factors effecting only the offender. The challenge becomes to discover how factors from different cells of the risk factor matrix work together. Clearly, however, instead of setting up factors to compete in explaining an outcome, we should look at how the factors may combine and interact to result in the outcome of interest.

Many of the theories discussed in the literature review have begun to explore factors outside the offender that effect the outcome of a violent event. For example,

research has analysed the role of the victim and the interaction that occurs between combatants. However, much of the research discussed in the second chapter still views each condition as acting independently of one another. This may be because the method of analysis used in much of this research makes this assumption and the research findings must mirror the assumptions made by the method. A strength of QCA is that it encourages us to think about possible interactions between conditions, therefore allowing theorizing to become more holistic in its approach to violent events.

The current study stands on its own in its use of conjunctural reasoning in the understanding of violent events. Therefore, it is not possible to directly compare the results attained by this study to previous research. Nevertheless, this study confirms the importance of the conditions reviewed in the second chapter for the study of violent behaviour. For example, Felson and Steadman (1983), Luckenbill (1977) and this study find that the presence of bystanders is an important factor in some violent events. Likewise, Curtis (1974), Wolfgang (1957), and this study find provocation to be salient in some violent outcomes. The important distinction between previous research on violent events and the current project is this study's use of conjunctural reasoning. Each condition was found to interact with other conditions to result in the outcome of interest.

Yet, formulating conjunctural theories is not as simple as interpreting the results of a Qualitative Comparative Analysis. Much thought must be given to what conditions are selected for analysis. Because of its deterministic nature, QCA will provide a solution, regardless of how implausible, given a set of conditions and a mix of positive and negative outcomes (Amenta & Poulsen, 1994). The importance of sound theoretical

formulations, including properly conceptualized and accurately measured outcomes and conditions, becomes paramount.

However, even a well constructed Qualitative Comparative Analysis should come with an important caveat. Specifically, none of the configurations that represent a QCA solution should be regarded as straightforward determinants of behaviour. This is clearly illustrated by the fact that most configurations in the original truth table of this study result in contradictory outcomes. If the configurations were straightforward determinants of behaviour, contradictory configurations would not have resulted – all cases in a configuration would simply have had the same outcome. What must be kept in mind is that a Qualitative Comparative Analysis consists only of a listing, logical sorting, and minimization of conditions thought important to an outcome of interest. An important component of any human interaction, the subjective meaning given to the interaction by participants, is not part of the analysis. Therefore, an important part of the social interaction is not accounted for in this type of analysis. However, in general, QCA is able to provide a type of analysis that can be seen as more sensitive to context and holistic in nature than typical quantitative analyses.

QCA as a Mid-Ground to Qualitative and Quantitative Methods

Ragin (1987) presents Qualitative Comparative Analysis as a bridge between the traditional case-orientated qualitative methods and the traditional variable-orientated quantitative methods. While QCA has features in common with both methods, it is not meant as a replacement of either method, but rather as a complement to either or both methods (Coverdill et al., 1994; Griffin & Ragin, 1994; Romme, 1995). The danger lies in expecting QCA, or any other method, to be able to fully explain complex human

behaviour. The results of a Qualitative Comparative Analysis can be misleading and must be used carefully. Therefore, QCA, like any other research method, is most useful when its strengths and limitations are clearly acknowledged and it is used in an appropriate manner. The following sections compare traditional qualitative and quantitative methods to QCA, highlighting the commonalties each traditional method shares with QCA, some advantages and disadvantages of using QCA compared to the traditional methods, and examples highlighting how QCA can complement either traditional method.

Qualitative methods and QCA. The holistic, interpretative focus of QCA likens it to the qualitative methods. QCA has several features in common with qualitative methods. First, and in clear distinction to quantitative methods, both QCA and qualitative methods avoid thinking about causation in probabilistic terms. Conditions do not increase or decrease the likelihood of an outcome; rather both types of analyses seek to describe attributes or circumstances thought to lead to a particular event outcome (Coverdill et al., 1994). In addition, both methods focus on analyzing, in a holistic manner, the complex patterns of interaction between conditions. Like qualitative methods, QCA has a strong inductive element because it simplifies the complexity of data from the bottom up, in a step-wise, systematic manner (Romme, 1995).

The major advantage of QCA over the qualitative methods is its ability to analyze large numbers of cases. QCA not only produces results that highlight the complexity of the phenomena under study, it also, because it can analyze many cases, produces results that can be generalized, thereby improving external validity. QCA offers a systematic, replicable approach to data reduction that may abate some of the criticisms of the qualitative approach. For example, the logical, systematic, and easily replicable manner

in which QCA minimizes the data structure may deflect some critics concerns with researcher subjectivity. In fact, QCA may illuminate patterns in the data structure that were unexpected by the traditional method thus generating alternative theoretical approaches.

However, QCA has some limitations in comparison to the traditional qualitative methods. Despite working in bottom up manner, QCA cannot be called a truly inductive method. In the Boolean approach, all conditions must be defined, selected, and measured before the analysis is to begin. From a post-modern perspective, this heavy reliance on definition, selection, and measurement may bring charges of researcher bias. In addition, QCA is bound to the conditions and outcomes that are amenable to dichotomous measurement. Conditions that are not easily measured, such as subjective interpretations of an event, cannot be included in the analysis. Likewise, Boolean analysis is not able to attend to temporal ordering of conditions. In the analysis, conditions are just present or absent, the order in which they occur is not relevant to the analysis.

Granted QCA's strengths and weaknesses, this method can easily and successfully be used in conjunction with traditional qualitative methods. For example, given the ease and speed in which a data set can be reduced using Boolean techniques, QCA can be utilized to carefully structure large amounts of data. Following QCA's identification of key configurations in the data structure, a more detailed qualitative approach can examine the cases represented by these key configurations.

Quantitative methods and QCA. On the other hand, the analytic determinism of QCA also likens it to the quantitative methods. Both QCA and traditional quantitative methods endeavor to find patterns or generalities across a large number of cases using,

respectively, logical or statistical algorithms. This search for generalities usually occurs in a deductive manner. In both methods, the analyst makes crucial decisions about the course of the analysis. These decisions occur both at the "front" end and "back" end of the analysis. At the "front" end, the analyst must make decisions about case selection, choice of theory to use, measurement strategies, and selecting certain variables/conditions to analyze. At the "back" end, decisions are made about the significance of results (Griffin & Ragin, 1994). Despite the air of objectivity associated with quantitative methods, these decisions can potentially occur in a less than objective manner.

The main advantage of QCA over traditional quantitative methods concerns the way in which QCA holistically views cases. This holistic view not only encourages, but requires the researcher to consider the context in which specific conditions are important. At the outset of the analysis, QCA assumes and examines for complex interactions between conditions. Most outcomes of interest to social scientists are thought to be the product of complex interactions between conditions. In contrast, most quantitative procedures assume variables act independently of one another. Finally, QCA permits, and often insists on, the researcher working closely with the data. For example, in the results described above, the original results prompted additional testing and recoding of the data structure. In QCA, any manipulation of the data set is done with the complete control and awareness of the analyst.

In comparison to most traditional quantitative procedures, the logical algorithms utilized by QCA are considered less technically sophisticated than the multivariate techniques (Romme, 1995). Since QCA is not probabilistic in nature, it does not attend to the central-limit theorem and issues of sampling variability. Therefore, the

generalizability of results can never be assured. In addition, QCA only deals with conditions and outcomes that are dichotomously categorized. Many phenomena in the social world are difficult to dichotomize, and in doing so, the phenomena of interest may be unfairly truncated. By forcing conditions and outcomes into a binary state, important information may be lost.

In consideration of QCA's strengths and limitations, this method can easily complement a traditional quantitative approach. For example, after completing a Boolean analysis, each minimized configuration in the solution could be considered a model and tested using structural equation modeling. Or, since a logit regression analysis can use the exact same data matrix as a Boolean analysis, the results of these two types of procedures could be compared. By completing both a traditional quantitative procedure and a Boolean analysis, interesting and important distinctions and conclusions might be drawn about outcomes of interest.

On the whole, "QCA brings some of the methodological discipline and rigor of quantitative analysis to qualitative analysis and some of the causal complexity and inductive sensitivity of qualitative analysis to quantitative analysis" (Coverdill et al., 1994, p.78). However, QCA should not be applied in a mechanistic fashion. Before conducting a Boolean analysis, as with any research procedure, a clear understanding of the limitations of the procedure and the nature of results produced must be considered. Application of the Boolean method, in conjunction with an appropriate traditional method, may expand the way in which a phenomena is understood.

Directions For Further Research

The current research project represents an initial application of Qualitative Comparative Analysis to the study of violent events. As such, this study may serve as a starting point for other studies. Subsequent research may further develop several aspects of this study. Returning to the risk factor matrix presented in Table 1, the current study was able to only include in the analysis a limited number of cells from the matrix. Further research designed to include additional conditions representing other cells of the matrix would likely provide further understanding of the conditions important in violent events. Two specific conditions that would be important to explore are the social relationship between the participants in a violent event (e.g., stranger or acquaintance) and the gender of event participants (e.g., male offenders and female victims, male offenders and male victims, etc.). Another important avenue of research would be to replicate this type of analysis with other research participants in other settings. Analyzing more and/or different conditions in other research settings might indicate which conditions are most salient in violent events. These research contributions would extend the validity of this type of analysis.

An alternative to studying the combination of conditions that result in violent outcomes would be to study the complement of this outcome – combinations of conditions that do not result in violence. In this current project, studying the complement would mean analyzing the configurations of conditions from events where the victim does not suffer any physical harm. Understanding the differences between charged interactions that result in physical harm to the victim and interactions that do not have

this outcome might help in identifying what type of situations escalate to physical violence.

As discussed in the section above, a Qualitative Comparative Analysis is best complemented with a traditional case-orientated or variable-orientated research method. By triangulating results in this manner, theoretical perspectives may become evident that may not have been detected with the use of only one method. Ultimately, further research along these lines would provide better understandings of violent events. In the body of literature dealing with violence, theories that consider conditions in a conjunctural manner are non-existent. Qualitative Comparative Analysis can provide a means to help develop more comprehensive theories that deal with complex phenomena such as violent events.

Conclusion

The objective of this research project was to provide a Qualitative Comparative Analysis of violent events that result in physical harm to the victim. This procedure combines features of both case-orientated qualitative methods and variable-orientated quantitative methods. Using Boolean logic and algebra, this method identifies the most logical, parsimonious configurations of conditions that indicate the outcome of interest. The Boolean analysis was conducted in three stages. The results indicate that no single factor studied is either necessary or sufficient to produce a violent outcome. Rather, several combinations of conditions seem important in violent events. These results suggest that, in the study of violent interactions, it would be useful to include elements from multiple levels of explanation, covering predisposing, situational, and activating factors.

This method of analysis provided an interesting and unique research perspective on violent interactions. However, like any research method, QCA has specific strengths and weaknesses. QCA is most effective when backed by strong conjunctural theories and combined with a more traditional qualitative or quantitative research method. Ultimately, the choice of method, or combination of methods, depends on the research goals, research question, research sample, and the nature of the data.

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Appendix A

FACS Violence Questionnaire - Men

The following questionnaire is designed to better understand the circumstances involved in troublesome situations. The questionnaire asks about your family, yourself and your past, and how you cope with problems. There are no right or wrong answers. The results of this questionnaire will be used solely for research purposes and program evaluation.

All responses will be kept **confidential**.
Your name will **not** appear on any reports of the results of this research, and your name will **not** be associated with any information in this questionnaire.
Your answers will **not** be discussed with anyone outside this clinic without your permission, and this questionnaire will **not** be put on your file.

Please read the following questions and answer each one of them. If you do not understand a question, please ask for help.

There are four types of questions. Here is an example of each type of question:

1) Circle one answer
My birthday is in:

1. Spring
2. Summer
3. Fall
4. Winter

2) Circle as many answers as apply
In my spare time, I like to:

1. Watch TV
2. Go to the bar
3. Read
4. Go for a walk
5. Go shopping

3) Circle the appropriate number for each question.
1 = YES
0 = NO
I like to watch hockey games on TV..... 1 0
My favourite colour is blue..... 1 0

4) Write a word, a number or a short sentence
What is your job? _____

SECTION D

This section asks questions about how you handle your anger. Please answer all the questions.

1) In general, how often are you involved in a physical fight with your wife or girlfriend? (Circle one)
   1. Once a day
   2. Once a week
   3. Once a month
   4. A few times a year
   5. Once a year
   6. Less than once a year
   7. Never
   8. No wife or girlfriend

2) In the last year, how many times have you been in a physical fight with your wife or girlfriend?
   _____ (Write down a number)

3) In general, how often are you involved in a physical fight with someone **other than** your wife or girlfriend? (Circle one)
   1. Once a day
   2. Once a week
   3. Once a month
   4. A few times a year
   5. Once a year
   6. Less than once a year
   7. Never

4) In the last year, how many times have you been in a physical fight with someone **other than** your wife or girlfriend?
   _____ (Write down a number)

5) Have you ever used a weapon like a stick, knife or gun in a fight since you were 18 years old?
   1. YES 0. NO

6) Since the age of 18, have you ever hit someone so hard that they had to go to the hospital?
   1. YES 0. NO

7) Describe the most serious physical fight you have ever been in as an adult. (Write one or two sentences)

8) Have you ever hit, shoved, slapped or kicked a partner in a previous relationship?

1. YES 0. NO

9) Have you ever spanked or hit a child (yours or anyone else's) hard enough so that he or she had bruises, or had to stay in bed or see a doctor?

1. YES 0. NO

Please read each statement and indicate how often you do or feel each of the things described, by circling the appropriate number.

0 = NEVER
1 = SOMETIMES
2 = OFTEN
3 = VERY OFTEN

10)	Do you find that you get angry very easily?	0 1 2 3
11)	How often do you feel very angry at people?	0 1 2 3
12)	Do you find that you get angry for no reason at all?	0 1 2 3
13)	When angry, do you get a weapon?	0 1 2 3
14)	Have you ever caused injury in a fight? (e.g. bruises, bleeding, or broken bones)	0 1 2 3
15)	Have you ever hit or attacked a member of your family?	0 1 2 3
16)	Have you ever hit or attacked someone who is not a member of your family?	0 1 2 3
17)	Have you ever used a weapon to try to harm someone?	0 1 2 3
18)	Are weapons easily accessible to you?	0 1 2 3

Please circle the appropriate answer:

0 = NEVER
1 = ONCE
2 = TWICE
3 = MORE THAN TWICE

19)	How often have you been arrested for a nonviolent crime such as shoplifting or forgery?	0 1 2 3
20)	Have you ever been arrested for a violent crime such as armed robbery or assault?	0 1 2 3
21)	Do you keep weapons in your home that you know how to use? (i.e. gun, knife)	1. YES 0. NO

THE INCIDENT WHY YOU ARE HERE

The next questions ask about the violent incident that has caused you to come here. When you answer these questions, think about that incident.

22) In the incident I . . . (Circle all that apply)

a. physically attacked someone
b. verbally threatened someone

23) What started the dispute? (Circle one)

1. An argument over money
2. An argument over a woman
3. An argument about work
4. An argument about alcohol/drugs
5. An argument about the kids
6. An argument about sex
7. We disagreed about something (describe _____)
8. Another kind of conflict (describe _____)

24a) The other person was . . . (Circle one)

1. Male
2. Female

24) Who was the other person? (Circle one)

1. Stranger
2. Friend
3. Neighbour
4. Someone I work with
5. Wife/partner/girlfriend
6. One of the kids
7. Relative
8. Other (describe _____)

25) Who started it? (Circle one)

1. I started it
2. The other person started it

26) What specifically were you charged with? (Write one sentence)

27) Where did this incident take place? (Circle one)

1. At home
2. At work
3. At school
4. On sidewalk/street/highway
5. In a restaurant or bar
6. In a park or recreation area
7. Elsewhere (describe _____)

28) Who was to blame? (Circle one)

1. I was to blame
2. The other person was to blame

29) What was the reason that you used violence? (Circle one)

1. To protect myself
2. To teach the other person a lesson
3. To get the other person to do something for me
4. Because I was mad
5. To get even

30) How much physical harm did you do? (Circle one)

1. None
2. A little
3. A fair bit
4. A lot

31) Are you sorry that you hurt the other person?

1. YES 0. NO

32) Could you have dealt with the problem in a way other than through the use of violence?

1. YES 0. NO

33) If Yes, how? If No, why not? (Write one sentence)

34) Do you think you were provoked?

1. YES 0. NO

35) If yes, how? (Write one sentence)

36) Were you stone cold sober at the time?

1. YES 0. NO

37) Was the other person stone cold sober?

1. YES 0. NO

38) Did you use a weapon against the other person?

1. YES 0. NO

39) Did the other person use a weapon against you?

1. YES 0. NO

40) Did you hit the other person so hard they had to go to the hospital?

1. YES 0. NO

41) Did the other person hit you so hard that you had to go to the hospital?

1. YES 0. NO

42) Were you bigger or smaller than the other person?

1. Bigger
2. Smaller
3. Same size

43) Was there any violence between you and the other person in the past?

1. YES 0. NO

44) Were other people present when the current incident happened?

1. YES 0. NO

45) If yes, did they add to the violence or reduce it?

1. They increased the violence
2. They decreased the violence
3. Neither

46) Did anyone try to stop the conflict?

1. YES 0. NO

47) If someone tried to stop the conflict, who was it? (Circle all that apply)

a. Stranger
b. Friend
c. Neighbour
d. Someone I work with
e. Wife or girlfriend
f. One of the kids
g. Relative
h. Other (describe _____)

48) Were the police called right away?

1. YES 0. NO

49) Did the police add to the violence or reduce it? (Circle one)

1. Increased the violence
2. Decreased the violence
3. Neither

50) If the police increased the violence describe how. (Write one sentence)

51) Did the police arrest you at that time?

1. YES 0. NO

52) Do you think that the arrest stopped the conflict from continuing?

1. YES 0. NO

53) Do you think that a crime occurred?

1. YES 0. NO

54) Who was guilty? (Circle one)

1. I was guilty
2. The other person was guilty

55) Did the violence solve the problem or is there still a problem between you and the other person? (Circle one)

1. The violence solved the problem
2. There is still a problem

56) Overall, how serious would you say this conflict was? (Circle one)

1. Not at all serious
2. A little bit serious
3. Quite serious
4. Extremely serious

57) At the time of the incident, were you . . . (Circle one)

1. Employed
2. Unemployed

58) At the time of the incident, did you have a regular place to live?

1. YES 0. NO

59) At the time of the incident, were you living with your wife or girlfriend?

1. YES 0. NO 2. No wife or girlfriend

Appendix B

Initial Truth Table With Number Of Raw Data Cases For Each Configuration And Outcome Code

	Combination*						Outcome		
							0 Cases	1 Cases	Output
Row	A	B	C	D	E	F	Freq. %	Freq. %	Code**
1.	0	1	1	0	0	0	2 50	2 50	C
2.	1	0	0	0	0	0	2 40	3 60	C
3.	0	0	0	1	1	1	4 44	5 56	C
4.	1	1	1	1	0	1	8 42	11 58	C
5.	1	0	1	1	1	1	4 31	9 69	C
6.	1	1	1	1	1	0	5 71	2 29	C
7.	1	0	0	1	1	1	4 25	12 75	C
8.	1	0	0	0	0	1	0 0	11 100	1
9.	0	1	0	0	1	1	2 50	2 50	C
10.	1	0	0	1	1	0	1 50	1 50	C
11.	1	0	1	0	0	1	4 44	5 56	C
12.	1	0	1	0	1	0	10 56	8 44	C
13.	0	0	1	0	0	0	1 33	2 67	C
14.	1	1	1	0	1	1	16 52	15 48	C
15.	1	0	1	0	1	1	10 42	14 58	C
16.	1	1	1	0	0	1	7 41	10 59	C
17.	1	1	0	1	0	1	4 80	1 20	C
18.	1	0	0	0	1	1	12 34	23 66	C
19.	0	0	1	0	1	0	5 71	2 29	C
20.	1	1	1	0	0	0	4 50	4 50	C
21.	1	1	0	0	1	0	1 50	1 50	C
22.	0	1	1	0	0	1	7 58	5 42	C
23.	1	0	0	1	0	1	1 11	8 89	C
24.	0	0	0	0	1	1	1 20	4 80	C
25.	1	1	1	0	1	0	2 67	1 33	C
26.	0	1	1	1	1	0	1 33	2 67	C
27.	1	0	0	0	1	0	1 12	7 88	C
28.	0	1	1	1	1	1	3 60	2 40	C
29.	0	0	0	1	0	1	1 14	6 86	C
30.	0	1	1	1	0	1	4 57	3 43	C
31.	0	0	0	0	0	0	2 100	0 0	0
32.	1	0	1	1	0	1	7 58	5 42	C

Initial Truth Table (continued)

	Combination*						Outcome				Output
							0 Cases		1 Cases		
Row	A	B	C	D	E	F	Freq.	%	Freq.	%	Code**
33.	0	1	1	1	0	0	1	100	0	0	0
34.	1	0	1	0	0	0	4	67	2	33	C
35.	1	0	1	1	0	0	0	0	3	100	1
36.	0	1	1	0	1	1	3	38	5	62	C
37.	0	1	0	1	0	1	0	0	1	100	1
38.	0	0	0	0	0	1	5	50	5	50	C
39.	1	1	0	1	1	1	0	0	3	100	1
40.	1	1	1	1	1	1	9	41	13	59	C
41.	0	1	1	0	1	0	2	40	3	60	C
42.	1	1	0	0	0	1	1	50	1	50	C
43.	1	0	1	1	1	0	2	67	1	33	C
44.	0	0	1	0	1	1	2	40	3	60	C
45.	1	0	0	1	0	0	1	33	2	67	C
46.	1	1	1	1	0	0	2	50	2	50	C
47.	0	0	0	1	0	0	0	0	1	100	1
48.	0	0	0	0	1	0	0	0	1	100	1
49.	1	1	0	0	0	0	1	100	0	0	0
50.	0	1	0	0	0	0	1	100	0	0	0
51.	1	1	0	0	1	1	4	50	4	50	C
52.	0	0	1	0	0	1	1	50	1	50	C
53.	0	1	0	0	0	1	1	50	1	50	C
54.	0	0	1	1	0	0	1	50	1	50	C

* Ten configurations of conditions did not have any cases associated with them. Therefore, these configurations were not included in the truth table

** 1 = configuration results in outcome
0 = configuration does not result in outcome
C = configuration has contradictory results (some cases result in outcome, some cases do not)

Appendix C

Revised Truth Table With Number Of Raw Data Cases, Significance of Binomial Difference, And Outcome Code

	Combination						Outcome			
							0 Cases	1 Cases	Sig.	Output
Row	A	B	C	D	E	F	Freq. %	Freq. %	(1-tailed)	Code
1.	0	1	1	0	0	0	2 50	2 50	.583	C
2.	1	0	0	0	0	0	2 40	3 60	.622	C
3.	0	0	0	1	1	1	4 44	5 56	.601	C
4.	1	1	1	1	0	1	8 42	11 58	.551	C
5.	1	0	1	1	1	1	4 31	9 69	.265	R1
6.	1	1	1	1	1	0	5 71	2 29	.133	R0
7.	1	0	0	1	1	1	4 25	12 75	.107	R1
8.	1	0	0	0	0	1	0 0	11 100	-	1
9.	0	1	0	0	1	1	2 50	2 50	.583	C
10.	1	0	0	1	1	0	1 50	1 50	.680	C
11.	1	0	1	0	0	1	4 44	5 56	.681	C
12.	1	0	1	0	1	0	10 56	8 44	.210	R0
13.	0	0	1	0	0	0	1 33	2 67	.598	C
14.	1	1	1	0	1	1	16 52	15 48	.229	R0
15.	1	0	1	0	1	1	10 42	14 58	.517	C
16.	1	1	1	0	0	1	7 41	10 59	.528	C
17.	1	1	0	1	0	1	4 80	1 20	.116	R0
18.	1	0	0	0	1	1	12 34	23 66	.179	R1
19.	0	0	1	0	1	0	5 71	2 29	.133	R0
20.	1	1	1	0	0	0	4 50	4 50	.486	C
21.	1	1	0	0	1	0	1 50	1 50	.680	C
22.	0	1	1	0	0	1	7 58	5 42	.225	R0
23.	1	0	0	1	0	1	1 11	8 89	.047	R1
24.	0	0	0	0	1	1	1 20	4 80	.281	R1
25.	1	1	1	0	1	0	2 67	1 33	.402	C
26.	0	1	1	1	1	0	1 33	2 67	.598	C
27.	1	0	0	0	1	0	1 12	7 88	.075	R1
28.	0	1	1	1	1	1	3 60	2 40	.378	C
29.	0	0	0	1	0	1	1 14	6 86	.118	R1
30.	0	1	1	1	0	1	4 57	3 43	.358	C
31.	0	0	0	0	0	0	2 100	0 0	-	0
32.	1	0	1	1	0	1	7 58	5 42	.225	R0
33.	0	1	1	1	0	0	1 100	0 0	-	0

Revised Truth Table (continued)

	Combination						Outcome			
							0 Cases	1 Cases	Sig.	Output
Row	A	B	C	D	E	F	Freq. %	Freq. %	(1-tailed)	Code*
34.	1	0	1	0	0	0	4 67	2 33	.229	R0
35.	1	0	1	1	0	0	0 0	3 100	-	1
36.	0	1	1	0	1	1	3 38	5 62	.514	C
37.	0	1	0	1	0	1	0 0	1 100	-	1
38.	0	0	0	0	0	1	5 50	5 50	.454	C
39.	1	1	0	1	1	1	0 0	3 100	-	1
40.	1	1	1	1	1	1	9 41	13 59	.496	C
41.	0	1	1	0	1	0	2 40	3 60	.622	C
42.	1	1	0	0	0	1	1 50	1 50	.680	C
43.	1	0	1	1	1	0	2 67	1 33	.402	C
44.	0	0	1	0	1	1	2 40	3 60	.622	C
45.	1	0	0	1	0	0	1 33	2 67	.598	C
46.	1	1	1	1	0	0	2 50	2 50	.583	C
47.	0	0	0	1	0	0	0 0	1 100	-	1
48.	0	0	0	0	1	0	0 0	1 100	-	1
49.	1	1	0	0	0	0	1 100	0 0	-	0
50.	0	1	0	0	0	0	1 100	0 0	-	0
51.	1	1	0	0	1	1	4 50	4 50	.486	C
52.	0	0	1	0	0	1	1 50	1 50	.680	C
53.	0	1	0	0	0	1	1 50	1 50	.680	C
54.	0	0	1	1	0	0	1 50	1 50	.680	C

* 1 = configuration results in outcome
R1 = configuration has been recoded as a positive outcome
0 = configuration does not result in outcome
R0 = configuration has been recoded as a negative outcome
C = configuration has contradictory results

Appendix D

Prime Implicant Chart For Revised Truth Table

Primes	Primitive Expressions																			
	000100		101100		000010		100010		100001		000101		100101		010101		000011		100011	
100--1									x				x						x	
-0001-					x		x										x		x	
10-111																				
1-0111																				
0-0101											x				x					
-00101											x		x							
00010-	x										x									
101100			x																	

Primes	Primitive Expressions																			
	100111		110111		101111															
100--1	x																			
-0001-																				
10-111	x				x															
1-0111	x		x																	
0-0101																				
-00101																				
00010-																				
101100																				

Appendix E

Prime Implicant Chart For Revised Truth Table Using Contradictory Configurations

Primitive Expressions

Primes	000100	101100	000010	100010	100001	000101	100101	010101	000011	100011	100111	110111	101111
-00--1					x	x	x		x	x	x		
-0-0-1					x				x	x			
--00-1					x				x	x			
100---				x	x		x			x	x		
1--111											x	x	x
10--11										x	x		x
1-0-11										x	x	x	
10-11-											x		x
0--011									x				
1--001					x								
1-001-				x						x			
10-1-0		x											
0-0-01						x		x					
-0001-			x	x					x	x			
-0010-	x					x	x						
-0-100	x	x											
01-101								x					
1-1100		x											

Appendix F

Final Solution For Each Analysis

Solution for Analysis #1:

G = A B c D E F +
a B c D e F +
A b C D e f +
A b c d e F +
a b c d E f +
a b c D e f

Legend
A = Angers easily
B = Respondent sober
C = Victim sober
D = Previous violence
E = Others present
F = Provoked
G = Physical harm to the victim

Solution for Analysis #2:

G = A b c F +
b c d E +
A b D E F +
A c D E F +
a c D e F +
a b c D e +
A b C D e f

Solution for Analysis #3:

G = b c F +
A D E F +
a c e F +
b c d E +
b D e f